July 20, 1942

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

ESTABLISHED 1882

HOLDEN

BUY WAR BONDS
and Protect the
American way of li

HEAT TREATING BATHS

for Maximum Torsional and Tensional Strength

HOLDEN PROCESSES—Products of continuous research . . . proven on production . . . streamlined for today's needs as a modern fighter or bomber plane.

MATERIALS AND EQUIPMENT—Both are backed by coordinated engineering—chemical, electrical, metallurgical. Sound engineering is basic for minimum production costs—in wartime and peacetime.

FERROUS and NON-FERROUS METALS—These developments are applicable to both ferrous and non-ferrous metals including every heat treating function up to 2350° F. for Ordnance, Naval or Aircraft production.

HIGH SPEED TOOLS—One leading manufacturer processes with our latest furnaces and baths 25 per cent or more of the total production of Milling Cutters in the United States.

THE A. F. HOLDEN COMPANY

NEW HAVEN, CONN.

Chemical and Furnace Division, 52 Richard St., West Haven, Conn.
Commercial Heat Treating Division, 200 Winchester Ave., New Haven, Conn.
Branch Warehouses — DETROIT: 1627 W. Fort St. CHICAGO: 1500 S. Western Ave.

BASE METALS BEHAVE LIKE NOBLE METALS in HOLDEN BATHS

Canadian Manufacturers of Holden Products: Peacock Bros., Montreal, Quebec.

Our Advertisment Published In 1911

Heald Service

The Way It Looks To Us

We believe that a manufacturer's service to his customer does not begin with simply manufacturing a certain type of machine, which he may design on rather general lines, nor stop with the mere selling of the machine and shipment from the factory.

The best results can only be obtained when the manufacturer and the customer work in full co-operation with each other.

With this end in view we have built up the HEALD SERVICE, whereby we can assist those who have bought HEALD MACHINES by adapting the machines to their work, and suggesting labor and time-saving devices through the careful study of our engineers.

To those confronted with grinding problems we can, therefore, offer the benefit of our large experience in grinding, and this department is at their disposal for advice and assistance if in any way our machines are adaptable for their work.

Note What This Means To You

It means that we want to assist you in every way possible to derive the greatest efficiency from Heald Machines.

Our experts are ready to take up your problems, study conditions, and work out with you the solution of these problems in connection with our machines through the knowledge we have gained from large experience in the use of grinding machines.

We invite those who are troubled with grinding problems to send us blueprints, or better still, samples of work, which may be the means of this department giving you helpful suggestions as to methods or ways of handling work, and in that way we may be able to assist you in getting the best possible output and quality, as your problems are very often similar to problems that have been solved by us in other shops and for other people.

This service becomes more valuable to you the more closely you are willing to work with us along these lines, and we trust that you will have no hesitation in calling on us at any time.

WHAT WE SAID 31 YEARS AGO IS TRUER THAN EVER TODAY

IN YOUR AREA

Today we have facilities, experience, equipment and personnel undreamed of in 1911 and yet it is all yours for the asking. We have established service offices in the following cities where a phone call will get you immediate attention.

CITY	PHONE
Chicago	State 6856
Cleveland	Cherry 2049
Dayton	Fulton 4109
Detroit	Madison 5060
Indianapolis	Lincoln 6478
Lansing	2-0805
New York	Barclay 7-4318
Rochester	Main 3479
Worcester	5-3191

The Heald Machine Company

10 New Bond Street, Worcester, Mass.

P. A. system speeds blast-furnace control

Something new has been added to the desk of our blast-furnace superintendent at Bethlehem—a microphone.

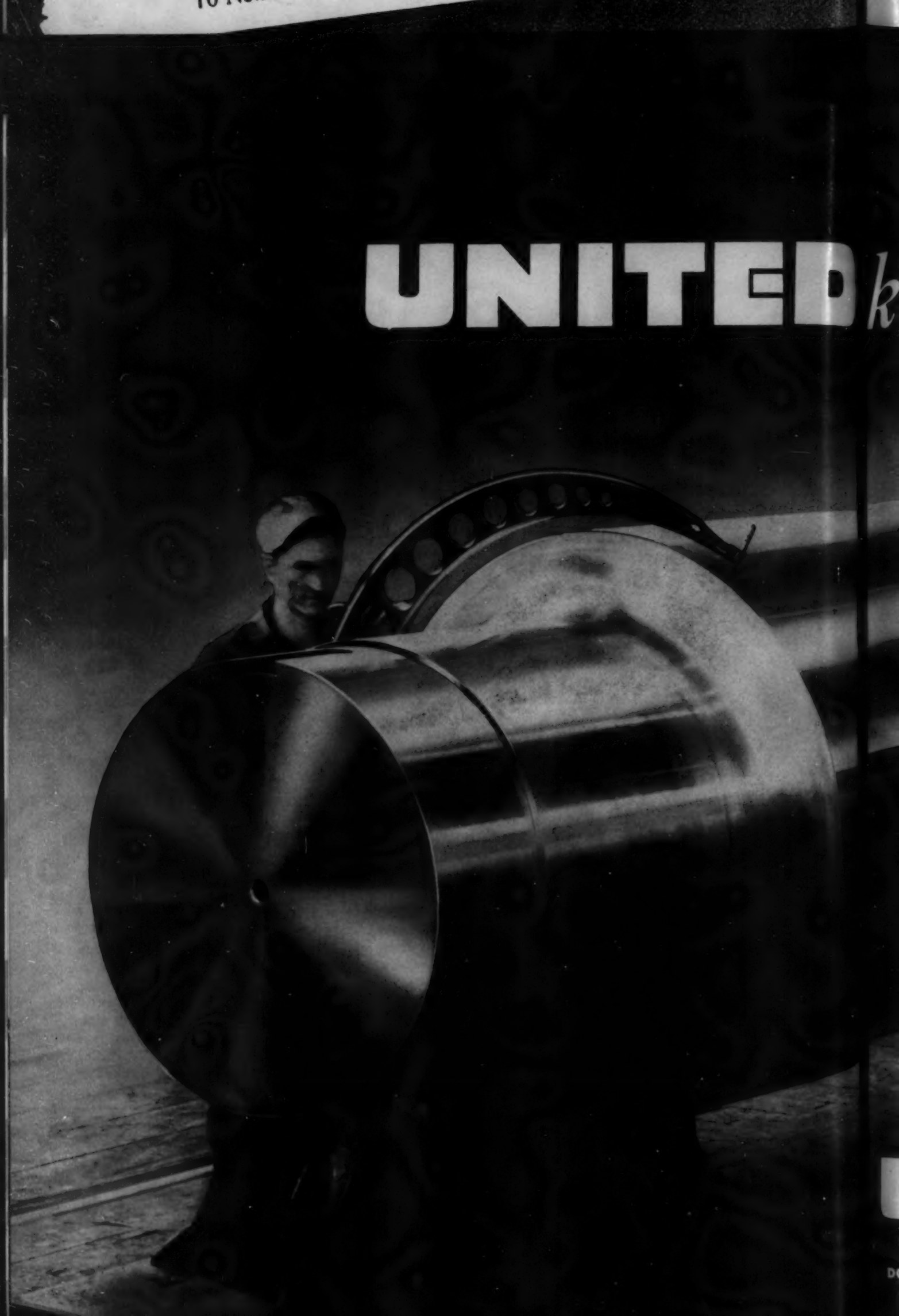
Now, in less than two minutes, the super can talk not only to *any* man in his department, but to *every* one of his 175 helpers on a given shift. There's a powerful loudspeaker and a microphone in every key location in the string of furnaces, engine houses, power stations and hot stoves which make up the blast furnace division of the plant.

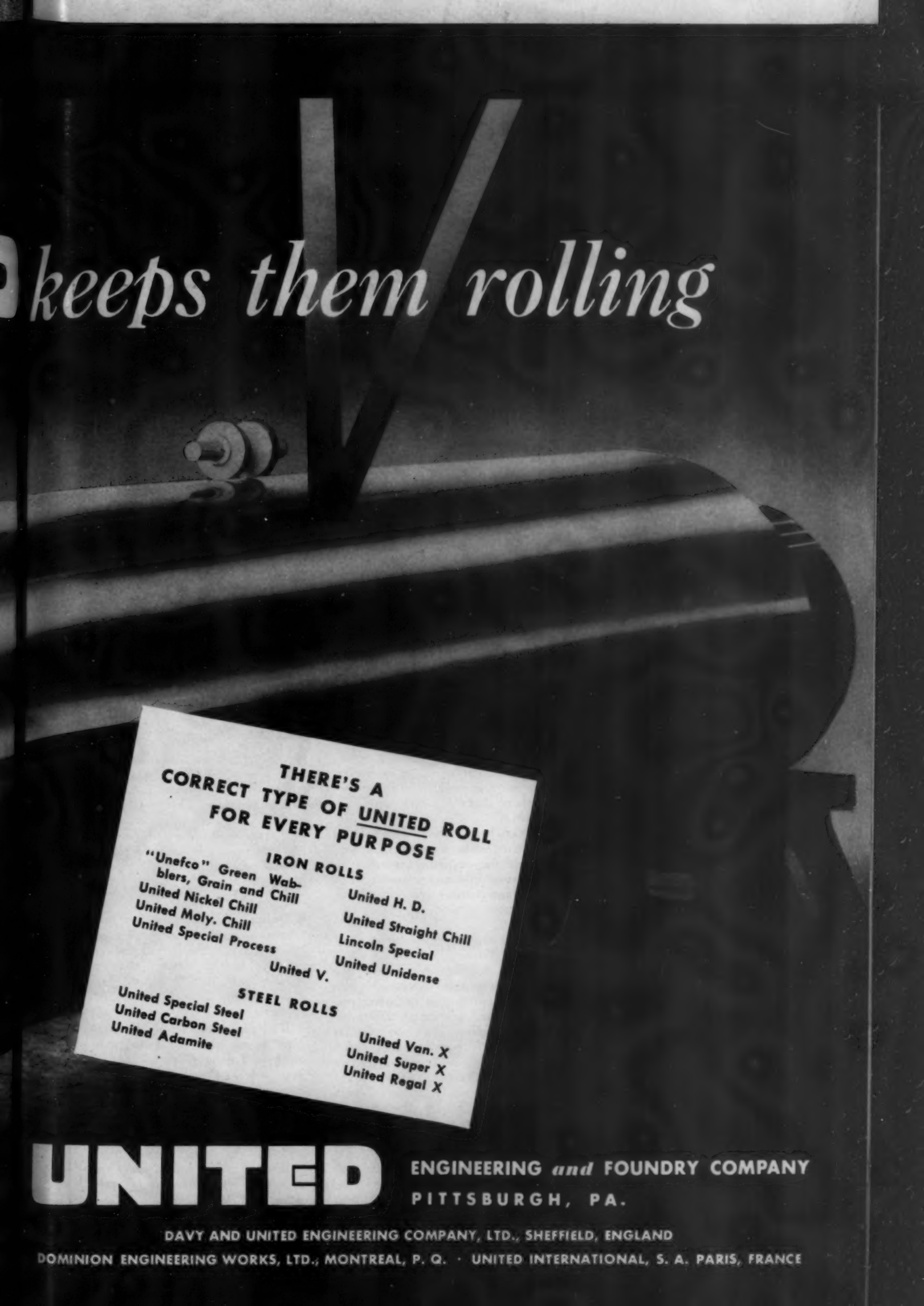
Control of every phase of operation is tightened up by the new P. A. system. Precious minutes are saved—and when you're running a string of blast-furnaces, minutes . . . even seconds . . . count big.

Instant communication between all parts of the blast-furnace department—which incidentally would be invaluable in an emergency—is saving thousands of dollars' worth of blast-furnace gas by rerouting it quickly to soaking pits, engine houses, heat-treating furnaces, or other units where it can be put to work. And, through closer control of operations, the Public Address system is helping to produce more and better pig iron, at a time when pig iron is vitally needed.

Right now, every pound of iron Bethlehem makes is of course being allocated to war production. But after the war, when trade once again flows through peacetime channels, such advances in production methods as this new rapid system of communication, applied under war conditions, will help Bethlehem better to serve its customers in every field of industry.

BETHLEHEM STEEL COMPANY


UNITED


keeps them rolling
THERE'S A
CORRECT TYPE OF UNITED ROLL
FOR EVERY PURPOSE
IRON ROLLS
"Unefco" Green Wabblers, Grain and Chill
United Nickel Chill
United Moly. Chill
United Special Process
United V.
United H. D.
United Straight Chill
Lincoln Special
United Unidense
STEEL ROLLS
United Special Steel
United Carbon Steel
United Adamite
United Van. X
United Super X
United Regal X
UNITED
ENGINEERING and FOUNDRY COMPANY
PITTSBURGH, PA.
DAVY AND UNITED ENGINEERING COMPANY, LTD., SHEFFIELD, ENGLAND
DOMINION ENGINEERING WORKS, LTD., MONTREAL, P. Q. · UNITED INTERNATIONAL, S. A. PARIS, FRANCE

Behind the Scenes with STEEL

Patriotism is easy to understand in America. It means looking out for yourself by looking out for your country.
—Calvin Coolidge

New Record

■ July 4 really meant something to the Gary plant of Carnegie-Illinois.

Working full blast on their usual holiday the three shifts rolled steel for a record of 252 per cent of the theoretical capacity. The previous mark was 185 per cent.

In the one day they turned out enough steel to produce 800,000 Garand rifles, 346 light medium tanks or three destroyers.

Belated Birthday

■ One of our chronic faults is forgetting birthdays, wedding anniversaries, and what not and as a result we well know the uncomfortable interior of the family dog house. And now just after getting out of the critical stage of forgetting Aunt Mazola's 31st (*sic!*) birthday, what do we do but skip right by the 12th anniversary of the change over from *Iron Trade Review* to STEEL!

The first issue of July, 1930 went out to an industry which was already looking for the "corner" and was received with lusty huzzahs and a few scattered reservations. STEEL had cut loose from the old trade paper pattern and with a new style of make-up and a modern editorial approach sparked the entire industrial publishing field.

Any successful enterprise *is* successful because it generates and constantly maintains a growing momentum which carries it on with initiative and new ideas. And STEEL, for the 627 weeks of its existence has had that kind of momentum.

STEEL was the first publication in the field to foresee the importance of Washington in the industrial picture and established "Windows of Washington" as a regular weekly feature.

STEEL was the first publication in the field to develop a complete Business Trend section of industrial charts and statistics.

STEEL was the first publication in the field to go to a high-finish coated paper stock for better printing and easier reading.

STEEL logically went to a Monday date of publication so that complete news and market reports for the entire previous week could be on subscribers' desks the first thing each week.

STEEL has constantly designed and written each issue so that the reader can get the maximum amount of information in a minimum length of time, and changes now planned will carry this "streamlining" even further.

Clear back in September of 1939, at the outbreak of the war in Europe, STEEL's editors foresaw the possibility of this country again getting into full-scale ordnance production and as a result STEEL carried throughout 1940 and 1941 far more much-needed technical information on ordnance production than any business paper in the country. The Ordnance Department, itself, in its monthly bulletin selected more than twice as many articles from STEEL than from any other paper.

And more recently, STEEL's complete Priorities, Allocations and Prices service has been and continues to be each week a literal godsend to thousands of busy men throughout the industry, and in the government agencies.

Yes—STEEL is Modern and will continue to serve you, for the duration and after, to the very best of its full ability.

Labor Camps

■ A total of 999 war production plants with joint labor-management committees were recently surveyed to determine the labor affiliations existing. 922 replied to give this picture:

Affiliation	No. Plants	No. Workers
CIO	310	789,886
AFL	132	247,952
Independent	67	216,692
Divided	43	220,154
Unknown	370	576,914
	922	2,051,598

CIO War Relief

■ We gathered the above from the labor division of WPB which also reports that the National CIO War Relief Committee is setting up plans to collect an hour's pay from every CIO member once a month for war relief purposes. From Ford plants alone $200,000 a month is expected.

Gibberish

■ Detroit Editor Art Allen forwards a letter from one of our good readers which can throw you into a whirling dervish quicker than a whiskey sour for breakfast. Just a one-sentence example should be enough:

Will you please let us know if there is any that you know, who think of Senator Couzens' idea of jury wheel flanging to permit pneumatic tires to function on steel paving in the same way as they do on concrete asphalt tar-mat?

After three readings, Allen footnotes:

What if/and/or he will easily put above the right thoughts to make anyhow?

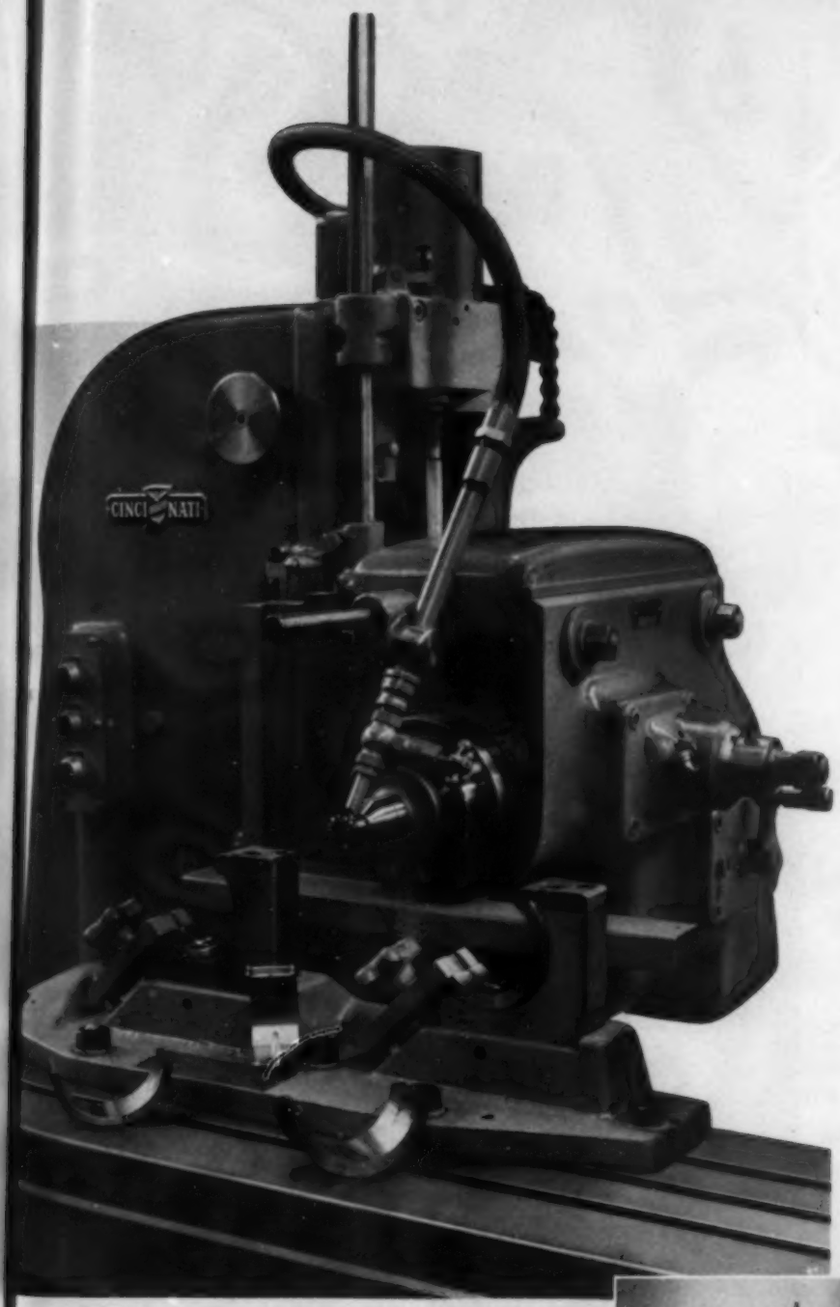
Vol. 111, No. 3, July 20, 1942, issue of STEEL, published every Monday at Cleveland, O. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Buy a War Bond Today!

This Equipment

MILLS TWO OIL-GROOVES ON A RADIUS

. . . In 43 Seconds



Oil grooving is a rather commonplace operation in shop practice until the groove must be **milled on a radius.** Then it requires a bit of head-scratching to figure out a rapid method that will give uniform results.

The bearing caps in the illustration above require two oil grooves about 15/16" long, on the **inside bore.** Quite obviously, the machine illustrated — A CINCINNATI No. 2-24 Automatic Rise and Fall Milling Machine — has no mechanism for circular milling, but this effect is produced by the cam controlled rise and fall spindle carrier. Thus the oil grooves are milled on a radius, with a **standard production machine.**

The fixture holds two parts in tandem. After the first oil groove is milled, the spindle carrier automatically rises to clear the fixture, the table advances to the next cut, and the carrier rapidly lowers to milling position. Both oil grooves are milled in 43 seconds. Parts are removed and replaced during the milling cut.

Perhaps many of those difficult and slow production parts in your shop could be milled faster and more accurately on a CINCINNATI No. 2-24 Milling Machine. Catalog M-909 gives you the complete story of these machines.

Right: CINCINNATI No. 2-24 Automatic Rise and Fall Milling Machine.

CINCINNATI

THE CINCINNATI MILLING MACHINE CO. CINCINNATI, OHIO, U.S.A.

TOOL ROOM AND MANUFACTURING MILLING MACHINES . . SURFACE BROACHING MACHINES . . . DIE SINKING MACHINES

Are You Taking

SURFACE CUTTING SPEEDS FOR VARIOUS GRADES OF COLD DRAWN CARBON STEEL ON AUTOMATIC SCREW MACHINES

Speeds given below are approximate and are to be used only as a basis from which proper speeds for the part in hand may be calculated. These figures represent averages for the general run of parts made from cold drawn steel. Any extraordinary features in the part to be made should be taken into consideration and the speeds altered accordingly.

A.I.S.I. Number	Present S.A.E. Number	Former S.A.E. Number	Surface Feet Per Minute	% Relative Speed Based on A.I.S.I. B1112 (S.A.E. 1112)
C1006	.....	.....	110	66
C1008	1008	.....	110	66
C1010 (light feeds)	1010	1010	120	72
C1012	.....	.....	120	72
C1014	.....	.....	120	72
C1015	1015	1015	120	72
C1016	1016	X1015	130	78
C1017	.....	.....	120	72
C1018	.....	.....	130	78
C1019	.....	.....	130	78
C1020	1020	1020	120	72
C1021	.....	.....	120	72
C1022	1022	X1020	130	78
C1023	.....	.....	125	76
C1024	1024	.....	120	72
C1025	1025	1025	120	72
C1026	.....	.....	120	72
C1029 (light feeds)	.....	.....	120	72
C1030	1030	1030	115	70
C1033	.....	.....	115	70
C1035	1035	1035	115	70
C1036	1036	.....	105	64
C1040	1040	1040	105	64
C1042	.....	.....	105	64
C1043	.....	.....	105	64
C1045	1045	1045	95	57
C1045 Annealed	1045	1045	120	72
C1050	1050	1050	90	54
C1050 Annealed	1050	1050	115	70
C1052 Annealed	1052	.....	85	51
C1055 Annealed	1055	1055	85	51
C1060 Annealed	1060	1060	85	51
C1061 Annealed	.....	.....	85	51
C1064 Annealed	.....	.....	80	49
C1066 Annealed	1066	X1065	80	49
C1068 Annealed	.....	.....	80	49
C1070 Annealed	1070	1070	80	49
C1074 Annealed	.....	.....	75	45
C1078 Annealed	.....	.....	75	45
C1080 Annealed	1080	1080	70	42
C1085 Annealed	1085	1085	70	42
C1086 Annealed	.....	.....	70	42
C1095 Annealed	1095	1095	70	42
B1008	.....	.....	130	78
B1011	.....	.....	130	78
FREE CUTTING STEELS				
C1109	.....	.....	135	82
C1110	.....	.....	135	82
C1112	.....	.....	135	82
C1113	.....	.....	155	94
C1115	1115	1115	135	82
C1116	.....	.....	155	94
C1117	1117	X1314	140	85
C1118	1118	X1315	140	85
C1120	.....	.....	135	82
C1121	.....	.....	135	82
C1122	.....	.....	135	82
C1132	1132	X1330	125	76
C1137	1137	X1335	120	72
C1141	1141	X1340	115	70
C1144	.....	.....	120	72
C1217	.....	.....	140	85
B1110	.....	.....	140	85
B1111	1111	.....	155	94
B1112 (Union Free Cut)	1112	1112	165	100
B1113 (Union Supercut)	1113	X1112	225	136

REPUBLIC STEEL — DEDICATION FOR VICTORY

REPUBLIC

FULL ADVANTAGE

OF THE

Uniform Machinability

OF UNION COLD DRAWN STEELS?

With wartime demands for mass production of duplicate steel parts becoming greater and more urgent day by day, every facility and every opportunity for increasing output must be utilized to the utmost.

You steel parts manufacturers are working wonders in production.

And we at Union Drawn will continue to do everything within our power to help you do the job.

The uniform machinability of Union Cold Drawn Steels—the outstanding feature of these steels for more than half a century—is being steadily maintained. The unvarying cutting qualities, the uniform structure, the freedom from tool-wearing abrasives and the smooth finish after machining are today equal to or better than those of last year or preceding years. Hence you can depend upon these steels to help you maintain consistently high production efficiency and quality of finished parts. Physical properties and heat treating qualities are being maintained at their high levels, too.

Are you taking full advantages of this uniform machinability in stepping up and holding an increased rate of production?

To help you establish the most efficient rate of output, and to provide you with a handy reference for comparing steels by their various designations and machinability, we present the table of surface-cutting speeds for various grades of cold drawn carbon steel shown on the opposite page.

While our most important job today would seem to be the production of every possible pound of the most machinable steel in needed analyses, we continue to feel an equal responsibility in assisting steel parts producers to obtain the highest rate of production of perfect parts from that steel at the lowest cost. If some particular problem concerning the use or performance of Union Cold Drawn Steel is bothering you, tell us about it. We want to help you find the answer—*quickly*.

UNION DRAWN STEEL DIVISION
REPUBLIC STEEL CORPORATION
MASSILLON • OHIO

Berger Manufacturing Division • Niles Steel Products Division
Steel and Tubes Division • Culvert Division • Truscon Steel Company
Export Department: Chrysler Building, New York, New York

Union Cold Drawn Steels

What Pickling Departments are doing to help

CONSERVE MONEL

After years of service this strategic metal is being re-fabricated into re-designed equipment

With wartime demands consuming all the Monel that can be produced, it is more important than ever to get maximum use out of this Nickel Alloy.

Many users are now taking advantage of the fact that even after years of service in pickling acids, Monel is still sound, and is readily fabricated and welded.

Sometimes old Monel equipment can be re-designed. The crates illustrated are a good example. Though eight years old, they were rebuilt and enlarged to fit new requirements.

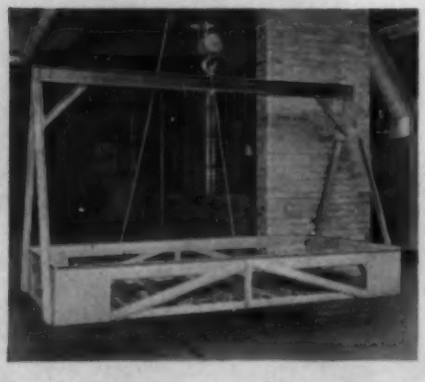
In other mills, the threaded ends are cut off old tie-rods, which are then re-threaded for use on smaller tanks. Some pieces are used for separator pins. The smaller tie-rods in turn are *again* cut up and used for still other parts.

If *you* have any old Monel equipment that you'd thought of discarding, take another look at it. Maybe you can re-fabricate it . . . and thus get further use out of this war-important material.

★ ★ ★

FIRST THINGS FIRST – With the Nation at war, supplies of Monel, Nickel and Nickel Alloys are needed for our armed forces. All efforts must now be aimed toward victory. In the meantime The International Nickel Company will continue to issue information which it is believed will be of interest to metal users who are concerned with the war needs of today and the peace-time progress of the future.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.



← **ORIGINAL CRATE:** the user of this Monel crate built in 1934 needed longer and deeper units, and found no difficulty in converting it to meet new requirements.

★ ★ ★

REBUILT UNIT: One of a number of new crates made from parts of the old ones that had seen 8 years of service. →

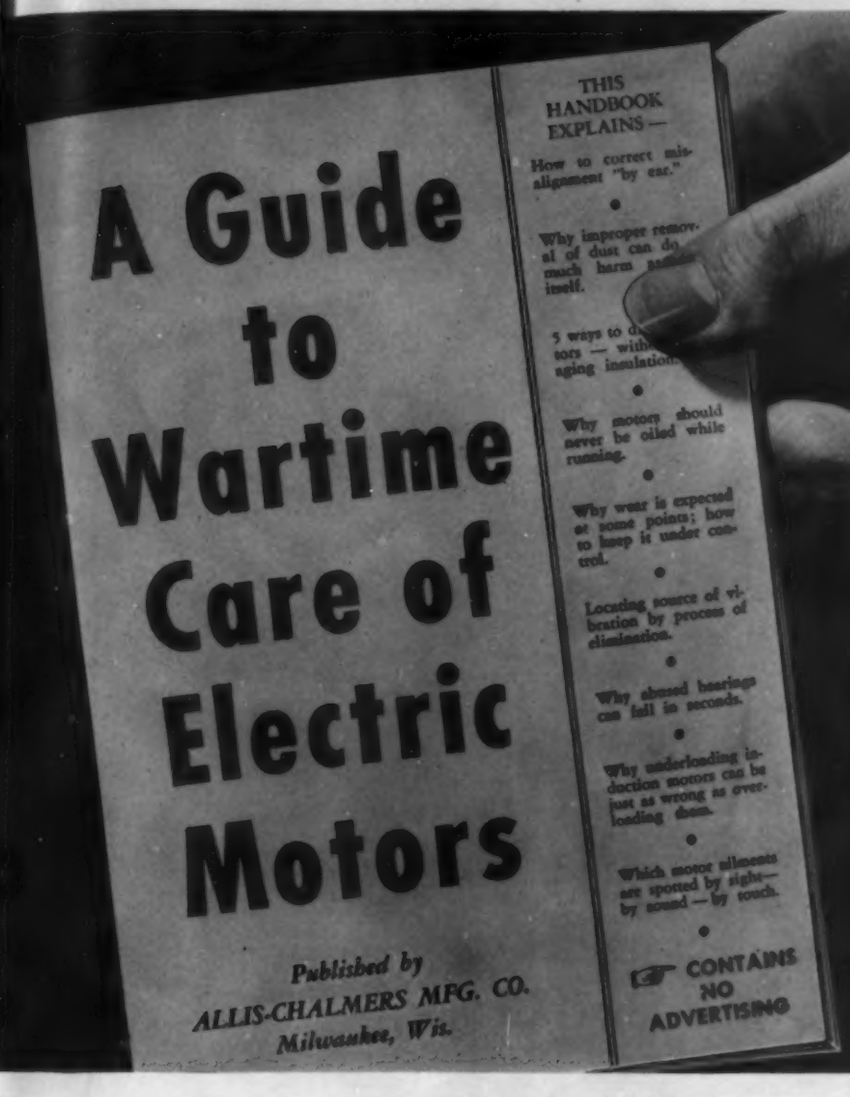
★ ★ ★ ★ ★ **INCO NICKEL ALLOYS** ★ ★ ★ ★ ★

MONEL • "K" MONEL • "S" MONEL • "R" MONEL • "KR" MONEL • INCONEL • NICKEL • "Z" NICKEL

Sheet . . . Strip . . . Rod . . . Tubing . . . Wire . . . Castings

Announcing

A VITAL NEW AID TO VICTORY PRODUCTION . . .


A Guide to Wartime Care of Electric Motors
THIS HANDBOOK EXPLAINS—
How to correct misalignment "by ear."
Why improper removal of dust can do much harm
Why motors should never be oiled while running.
Why wear is expected at some points; how to keep it under control.
Locating source of vibration by process of elimination.
Why sleeved bearings can fail in seconds.
Why underloading induction motors can be just as wrong as overloading them.
Which motor ailments are spotted by sight—by sound—by touch.
CONTAINS NO ADVERTISING
Published by
ALLIS-CHALMERS MFG. CO.
Milwaukee, Wis.

Your Copy is Free!

ENGINEERS — production managers — maintenance men — executives . . . here's a valuable new handbook that you're sure to want for your technical library . . . a book designed to help you meet today's *new* motor maintenance problems!

And they *are* new problems . . .

Wartime's three-shift production has crowded *triple-duty* for motors into every day. New working days have been added!

All told, a motor's working time has skyrocketed since the emergency from 1800 hours a year to *8700 hours!*

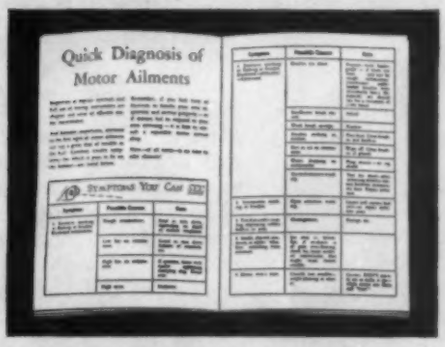
That means that inspection, adjustment, lubrication check-ups — all must be quadrupled . . . and must be geared up to wartime standards of efficiency!

To help you most, "A Guide to Wartime Care of Electric Motors" applies to *all* makes of standard, general-purpose motors. And it takes a *fresh* look at motor care.

For Allis-Chalmers recognizes — as you do — that maintenance "as usual" went out with Pearl Harbor.

Send for this Valuable new Handbook today

COMPLETELY ILLUSTRATED — Making principles of motor care crystal clear. Of particular value for training new men.



HANDY REFERENCE — Helping you catch motor troubles at early stage. Tear out order form and send for *your* free copy!

ALLIS-CHALMERS MFG. CO.
Milwaukee, Wisconsin

Gentlemen:

Yes, I would like to receive *free of charge* "A Guide to Wartime Care of Electric Motors".

(Name)

(Title)

(Company)

(Street Address)

(City and State) A 1533-3

ALLIS-CHALMERS
MILWAUKEE · WISCONSIN

WE WORK FOR VICTORY — WE PLAN FOR PEACE

Now they fly ten times as long without overhauling!

The flimsy crates of World War 1 needed overhauling after as little as 24 flying hours. But today's planes fly hundreds of hours at much higher speeds before a major overhaul. The reason? New materials, new designs and new methods of finishing metal surfaces. Finishes so nearly perfect that bearings, cylinders, pistons and cams are made practically wear-proof! It's a process in which Carborundum has played an important part...by supplying the finishing wheels and stones required.

Formerly ultra-finishing was a long tedious task. But thanks to the new process, finishes accurate to a few millionths of an inch can now be produced on ground surfaces on a production basis. Application of these finishes to wartime engine production has improved the fighting efficiency not only of planes, but of tanks and other motorized equipment. Fewer men are needed for maintenance and repair.

Ultra-finishing with extremely fine grit wheels—as fine as 600 grit—is only one of many ways in which Carborundum may be able to help you save precious time. If you have a production problem that abrasives might solve, write The Carborundum Company, Niagara Falls, New York.

CARBORUNDUM
reg. u.s. PAT. OFF.
ABRASIVE PRODUCTS

Carborundum is a registered trade-mark of and indicates manufacture by The Carborundum Company.

Control...

THE CRITICAL FACTOR IN SHIP LAUNCHING OR STEEL CASTING

WHETHER the ship is launched by burning away anchor plates or by hydraulic trigger in a pit beneath the hull, it's careful *control* of the operation that sends her sliding smoothly down the ways . . . keeps her from running wild and suffering damage before she has made a single voyage.

Steel castings, too, have a "launching point" . . . melting. Only castings poured from a carefully controlled melt can be top quality.

Lebanon has combed the fields of equipment . . . methods . . . and, yes, of men . . . and chosen those that would make the greatest contributions to control. Lebanon is equipped for both arc and induction melting, according to the character of the steel desired. Optical pyrometer readings (illustrated above) are taken of every melt while it is being poured. A high standard of skill and experience must be met by all melting floor personnel.

Since no casting can be better than the melt from which it is poured, the premium on quality is careful control. Lebanon pays that premium in full. That's why Circle Ⓛ Castings are the choice of users who must be *sure* of quality . . . who cannot run the risks of the "pretty good" . . . such manufacturers as Sperry Gyroscope and Waterbury Tool.

Lebanon metallurgists are studying future applications for alloy and carbon steel castings of controlled quality . . . and are ready to discuss significant developments with forward looking organizations.

LEBANON STEEL FOUNDRY · LEBANON, PENNA.

ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

LEBANON *Stainless and Special Alloy* **STEEL CASTINGS**

CIRCLE L

An Emergency Statement

to Industrial Executives

Manufacturers—large and small—have a special opportunity to aid the war effort—over and beyond the contribution they are already making.

That opportunity is Salvage.

No matter how much scrap is dug out of the attics and basements of homes, the fence corners and gullies of farms, war production factories will still fall far short of the scrap material needed unless the manufacturers of America get 100 per cent behind the program.

Six million additional tons of scrap iron and steel alone, as well as vast quantities of rubber and other materials, are urgently required to bring our war program to full strength.

Whether you are a lace curtain manufacturer or a maker of drop forgings the obligation is the same.

The job is more than simply collecting scrap material around the plant, or turning in the scrap which is created on the premises. It is a job of condemning obsolete machinery, clearing out unusable stocks, obsolete tools, dies, drills, fixtures, etc.

All unusable material, equipment, and stocks should be scrapped at once and put back into war production.

The philosophy of "It may come in handy some day" must give way to the doctrine of "My country needs it now."

Patriotic volunteer committees of executives are already hard at work on this problem in 421 industrial centers.

The Industrial Section of the Conservation Division has a corps of technical advisers who are prepared to work with all types of industries.

A thoroughgoing Salvage program in a factory can not only help meet the present emergency, but can help prepare that factory for its postwar operations through the elimination of once wasteful practices.

1 The first thing to do is to put some one individual in charge of Salvage in all departments of your business and give him not only the responsibility to act, but the authority to act.

2 The next thing to do is to get in touch with your local Industrial Salvage Committee and map out a detailed program with the materials and ideas that are available. Their program contains 17 simple steps.

If in any doubt, write or wire at once to the Conservation Division, War Production Board, Railroad Retirement Building, Washington, D. C.

This job is being tackled by a democratic nation through the volunteer efforts and initiative of democratically managed industrial concerns, rather than through directives or compulsion as it is done in Axis countries.

Every executive, every superintendent, every foreman and every worker in every plant can help.

The main thing is to get started now.

All unusable material, equipment, and stocks should be scrapped at once and put back into war production. Please read this message and act **now.**

D. M. NELSON, CHAIRMAN, WAR PRODUCTION BOARD

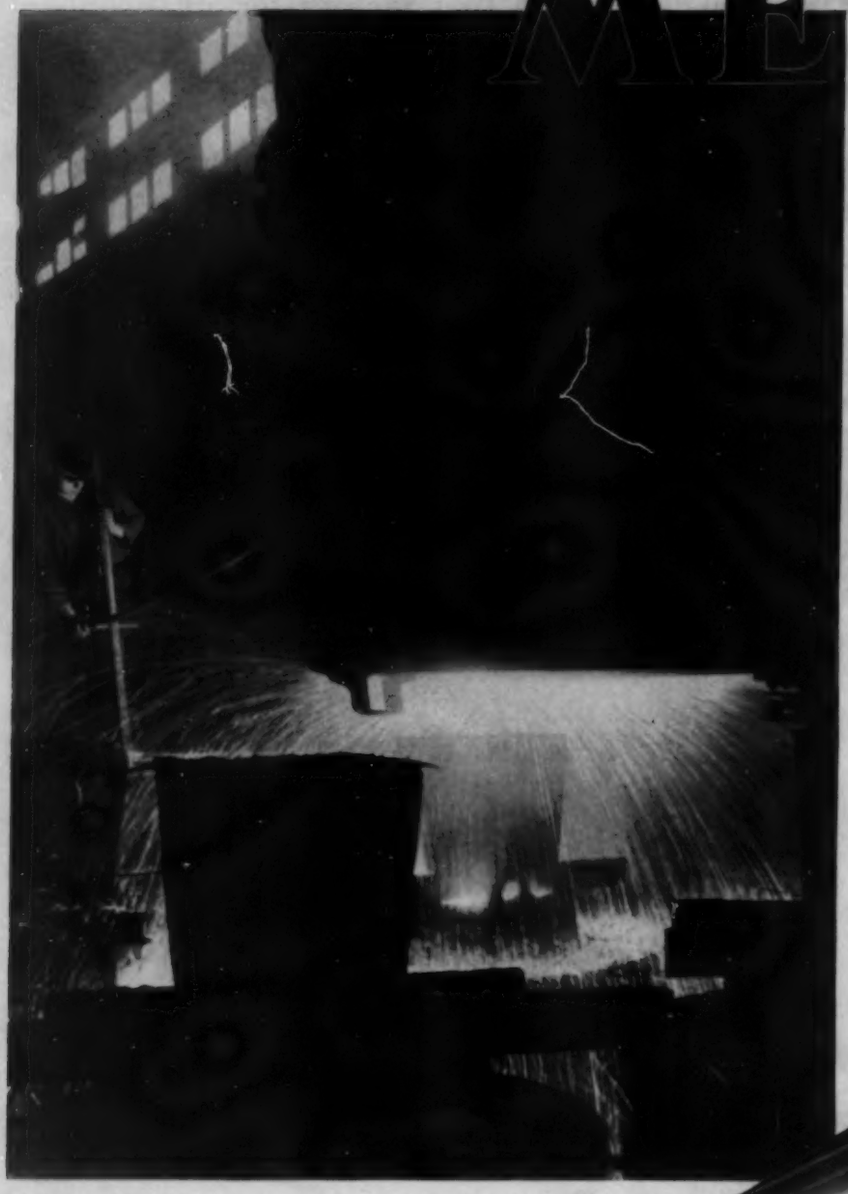
This message approved by Conservation Division

WAR PRODUCTION BOARD

This advertisement paid for by the American Industries Salvage Committee (representing and with funds provided by a group of leading industrial concerns).

SCRAP FROM HOMES AND FARMS—As individuals, search your home from attic to basement. Search your garage. Look at the old familiar things in a new light. Do you need them—or can you get along without them? Your country needs every pound of scrap iron and steel, other metals, rubber, rags and burlap to provide the fighting materials our armed forces must have. Take your scrap to the nearest Salvage Depot—give it to a charity—or sell it to a Junk dealer. . . . If you live on a farm, consult your County War Board or your farm implement dealer. In any case, your scrap will flow back into the blood stream of our war production.

MESTA



SPECIAL ALLOY CAST STEEL

BACKING-UP ROLLS

FOR FOUR HIGH HOT AND COLD STRIP MILLS

MESTA was among the first to be awarded the FLAG of the UNITED STATES BUREAU OF ORDNANCE and NAVY "E" PENNANT

MESTA MACHINE COMPANY · PITTSBURGH, PA.

The Days of Exploration are not Past

COLUMBUS could not have imagined that the New World he discovered would twice be called on to save his Old World from itself. Nor could he have had an inkling of our immense resources with which we built a dominating iron and steel industry providing the sinews of war and peace.

MALLEABLE

The founders of Belle City Malleable Iron Co. in 1892, four hundred years after Columbus, launched forth into a fifty year era of exploration and development in ferrous castings. Malleable iron grew from a substitute for wrought iron to an essential metal for mobile equipment.

STEEL

In the late 90's steel castings came into use and received a big boost with the electric melting furnace, one of the first of which in the Middle West was bought in 1916 for our new division, Racine Steel Castings Co.

BELECTRIC

Since the last war the development of gray iron as an engineering material has been far-reaching. *Belectric* Iron, electric furnace melted and graded from 35,000 to 65,000 lbs. tensile strength, is a specification iron cast to meet specified physical properties within close limits.

BELMALLOY

Exploring the possibilities of electric furnace melting and continuous kiln annealing, we brought out in 1935 *Belmalloy*, a pearlitic malleable, and *Belectromal*, a high strength malleable. These metals fit into the space between malleable and steel castings and relieve the pressure on steel castings or forgings for war production.

Send for our 50th Anniversary Booklet giving the story of ferrous castings. Examine your design and production set-up to see if you can use castings of our special metals for less readily obtainable materials.

B. C. M. I. CO.
1892 · · · 1942

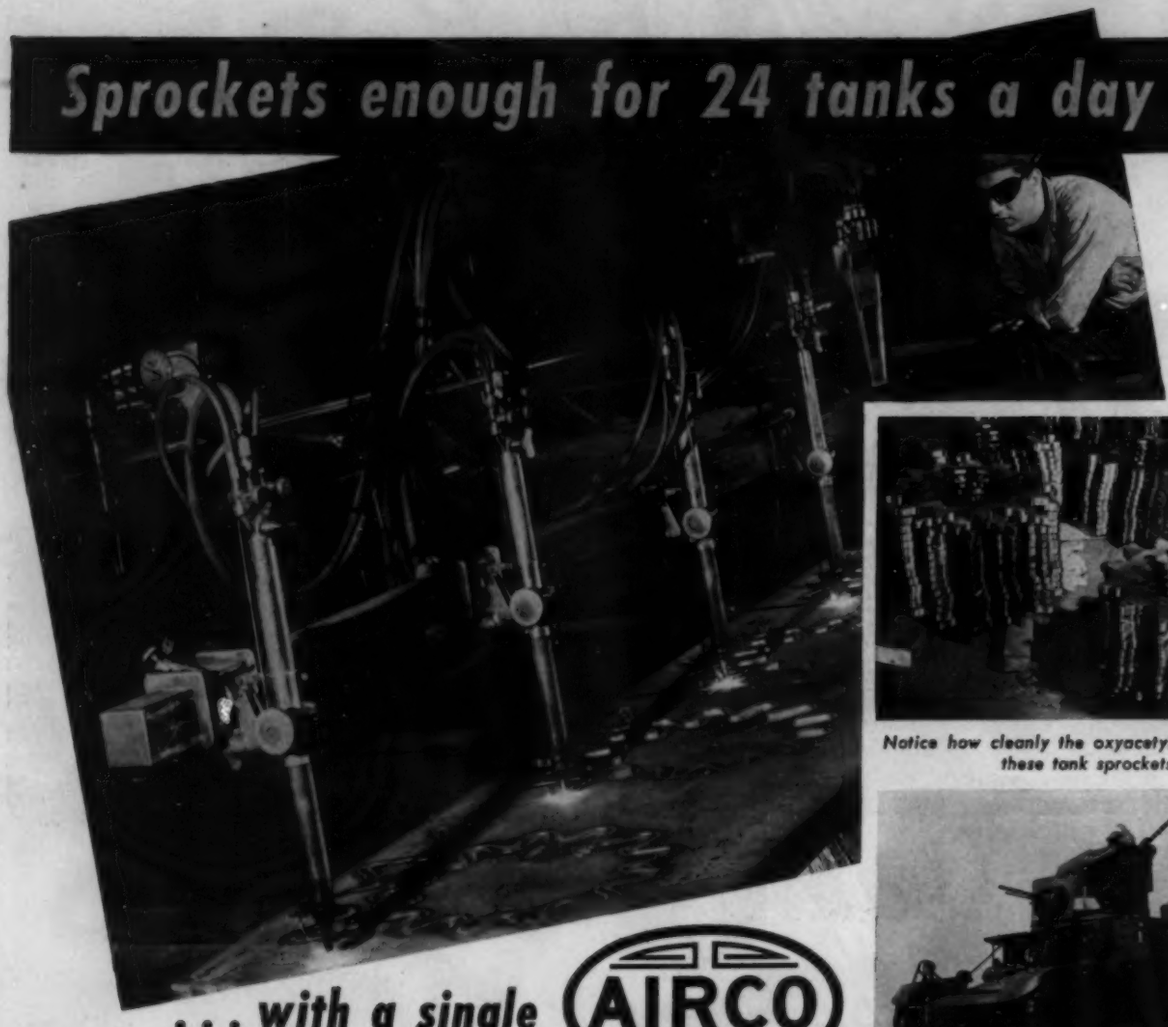
R. S. C. CO.
1912 · · · 1942

BELLE CITY MALLEABLE IRON CO.

RACINE STEEL CASTINGS CO.

Racine Wisconsin

Sprockets enough for 24 tanks a day . . .



Notice how cleanly the oxyacetylene flame cuts these tank sprockets.

Thousands of tanks like these will soon be taking their place in our armored forces — thanks, in part, to the time-saving production that oxyacetylene cutting makes possible.

. . . with a single AIRCO GAS CUTTING MACHINE

At this plant production of vital tank parts like these drive sprockets is keeping well ahead of the huge tank-building program, thanks to this Airco Travograph. In only twenty minutes, this machine accurately cuts both the inside and outside peripheries of four identical drive sprockets. Simply by changing the template which guides the torches, this machine can be made to cut many other shapes. While for cutting only one or few parts, not even a template is necessary, when the Travograph is equipped with a manual tracing device.

This typical example of stepped-up production is only one of many ways in which the oxyacetylene flame is helping to produce our country's arms more quickly and economically than ever before. The oxyacetylene flame prepares with speed and accuracy plate edges for both arc and gas welding. It hardens steel to any desired depth . . . cleans metal surfaces to assure long lasting paint jobs, resistant to rust and corrosion.

Air Reduction's war-time policy is to help American industry do the tough job we all face. Our nation-wide field engineering service and our research facilities on any problem involving the oxyacetylene flame and the electric arc are at your disposal.

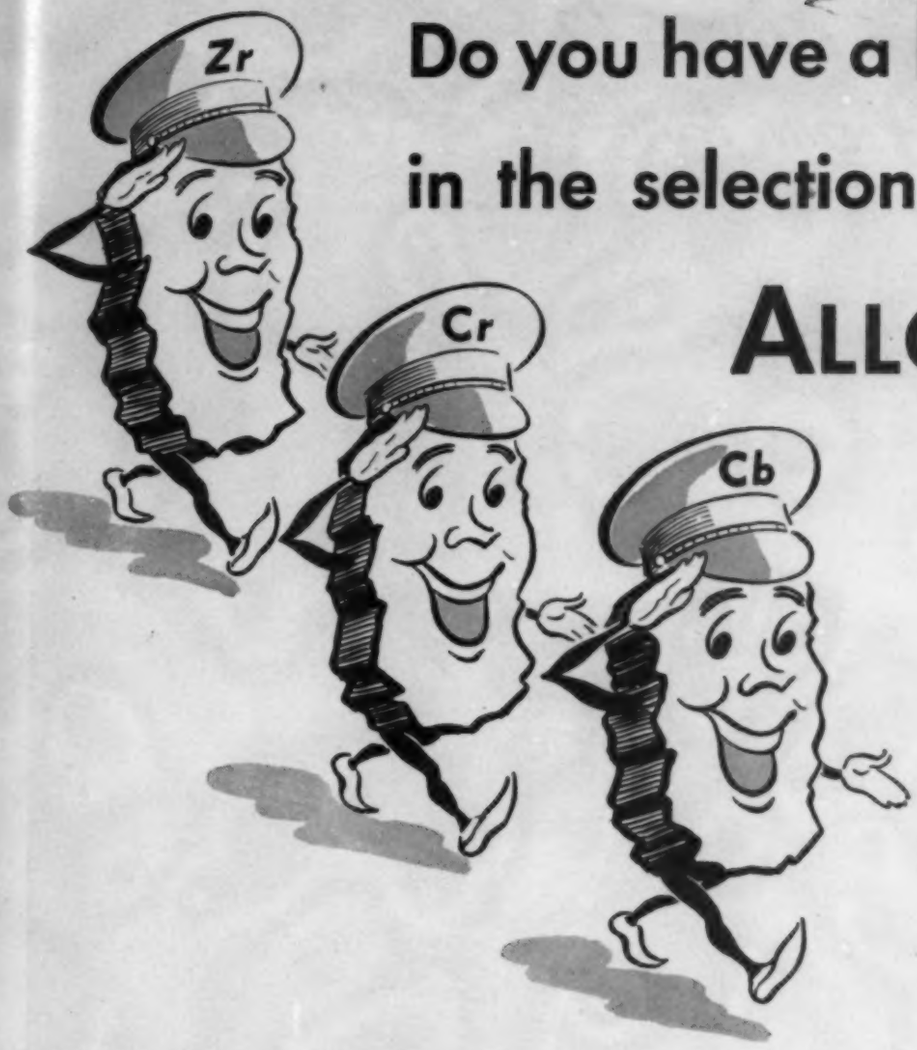
Air Reduction

General Offices: 60 EAST 42nd ST., NEW YORK, N. Y.

IN TEXAS
MAGNOLIA-AIRCO GAS PRODUCTS CO.
General Offices: HOUSTON, TEXAS
OFFICES IN ALL PRINCIPAL CITIES

AIRCO — WILSON

IDLE CYLINDERS ARE PRODUCTION SLACKERS: *Keep 'em tolling for victory!*



Do you have a PROBLEM in the selection or use of ALLOY STEEL?

...perhaps we have the answer

THESE are days when a high priority is needed to get any kind of steel. Because of this, every user of steel should select that grade which will give him the best service, so that he may avoid the need for replacements and the time lost in production shutdowns.

Many of the alloys used in making alloy steels . . . among them chromium, nickel, manganese, molybdenum, tungsten, and vanadium . . . are critical materials and should be conserved in every way possible.

In many cases where raw materials are scarce the most desirable grade of steel may be unavailable. However substitute steels with many properties of the hard-to-get grades can often be obtained.

We do not make steel of any kind, but for more than 35 years we have produced "Electromet" ferro-alloys and alloying metals used in the making of steel. With the knowledge accumulated from this experience, we are in a position to give impartial advice on the selection, fabrication, or use of alloy steels. If you have a specific problem concerning alloy steels, call on us. There is no obligation.

Get in the Scrap

You will receive more for your scrap and will help conserve alloys if you will keep alloy steel scrap separated and well identified.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York, N. Y.
In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

Electromet
Trade Mark
Ferro-Alloys & Metals

From Planes to Bombs... from Tanks to Jeeps...

N-A-X *9100 Series*

is on the fighting fronts— for victory

When Tokio received a calling card from a wave of U. S. Bombers, chances are some of the missiles were made of N-A-X 9100 Series of Alloy Steels. For this remarkable and truly versatile steel is being used for a wide variety of armament for our fighting forces . . . in planes, bombs, tanks, gun mounts, gun carriages, trucks, "jeeps" and other units.

N-A-X 9100 Series of alloy steels is an outstanding achievement of Great Lakes engineers and metallurgists. It is basically an alloy steel, with all strategic elements carefully balanced and held to an absolute minimum. It is being supplied in two general grades, with and without molybdenum, all other components of the analysis being held constant.

GREAT LAKES STEEL CORPORATION
Detroit, Michigan
Sales Offices in Principal Cities

Division of
NATIONAL STEEL CORPORATION
Executive Offices · Pittsburgh, Pa.

ROPE LIFE LARGELY DEPENDS ON THE OPERATOR

...Yes, even TRU-LAY *Preformed*

While American Cable TRU-LAY PREFORMED invariably lasts longer than ordinary non-preformed wire rope, it still is a precision machine made of steel (critical material) and subject to wear. Careful operators can make a wire rope last much longer, while inexperienced ones can quickly ruin it. Make sure your inexperienced operators know how to take care of wire ropes properly. Here are a few fundamental suggestions:

★ Inspect, clean and lubricate all wire rope regularly. Tighten fittings. Be sure hemp core is not dry, or corrosion or collapse may occur.

★ Be sure the rope is the proper one for the service. It should have proper strength, flexibility, resistance to abrasion, fatigue, crushing and heat. Consult your American Cable representative.

★ If drums or sheaves are small, or there is a tendency to whip or kink, specify TRU-LAY PREFORMED, the fatigue-resisting flexible rope.

★ Be careful of the fleet angle. If the rope deviates from the center plane of the sheave more than 1½ degrees, undue wear will result.

★ Don't allow bad spooling on drums. Spaces between wraps, or crossed wraps, cause crushing and binding. TRU-LAY PREFORMED spools better than most ropes.

Conserve steel by making your present equipment last longer. Proper inspection, lubrication and maintenance will make long-life TRU-LAY PREFORMED last *longer*.

AMERICAN CABLE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT

ESSENTIAL PRODUCTS . . . AMERICAN CABLE Wire Rope, TRU-STOP Emergency Brakes, TRU-LAY Control Cables, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Iron Castings, CAMPBELL Cutting Machines, FORD Hoists and Trolleys, HAZARD Wire Rope, Yacht Rigging, Aircraft Control Cables, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

HERE'S WHY

QUICK-MAKE QUICK-BREAK

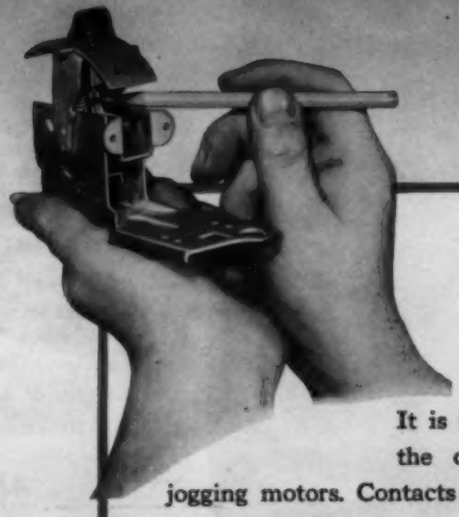
HELPS KEEP

PRODUCTION up... maintenance DOWN

Westinghouse "De-ion" Motor Watchman Manual Starters for a-c Motors up to 7½ hp.

Motor Watchman
Class 10-100, Size 1

Quick-break action alone in a motor starter is not enough. For long uninterrupted life, it is important to have quick-make action, too. Westinghouse "De-ion" Motor Watchman has both. No matter how slowly the toggle switch handle is raised to the "ON" position, as soon as it passes center, the positive-acting mechanism instantly exerts full pressure on the contacts. There is no chance of contacts carrying the full starting load before they are latched together tightly. This two-way protection against arcing minimizes pitting and burning, increases contact life. For complete information write for descriptive folder. Address Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7-N.



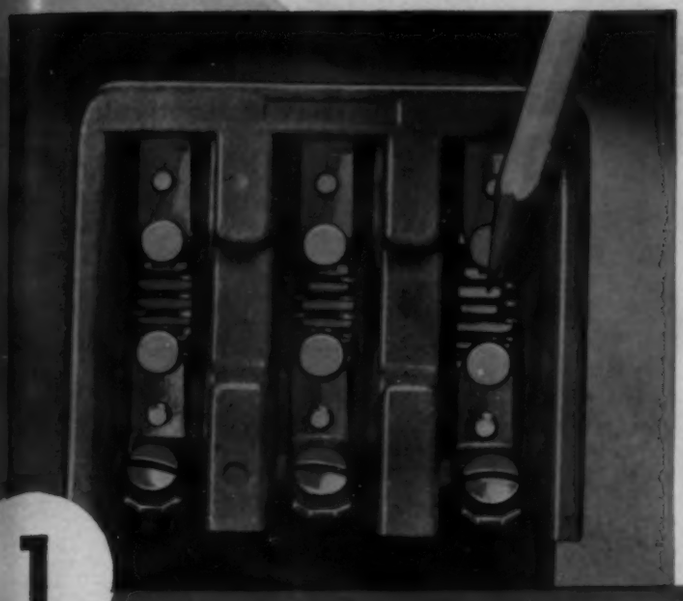
SPRING ACTION PREVENTS "TEASING"

It is impossible to "tease" the contacts, even when jogging motors. Contacts cannot be held partially closed. Two heavy steel springs which are under a constant 20-pound tension, give the positive quick-make quick-break action.

Westinghouse

THESE TWO FEATURES IN WESTINGHOUSE CONTROL DEVICES

MEAN added protection FOR ESSENTIAL MOTOR DRIVES!



1

"De-ion" ARC QUENCHING

"De-ion" arc quenching—an exclusive Westinghouse feature—increases life of contacts and reduces need for maintenance. "De-ion" grids confine, divide and extinguish the arc in one-half cycle, protecting contacts from excessive pitting or burning.

2

BI-METAL ACTION

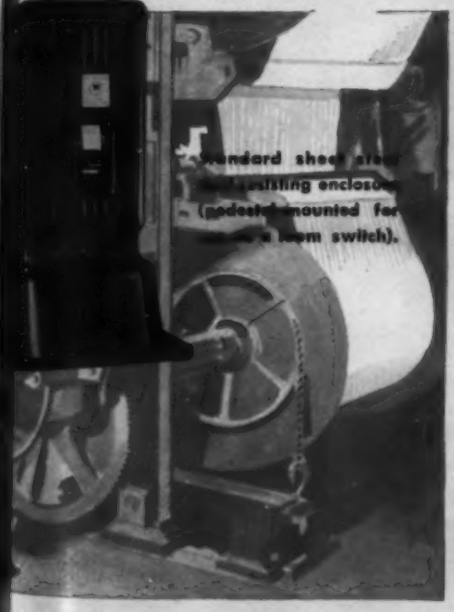
Snap-action bi-metal disk provides positive protection suited to the requirements of the motor drive. Accurate, factory calibrated inverse time action permits harmless overloads, but opens circuit with rifle-bullet speed on dangerous overloads.

Drives that are essential to today's production need the added assurance against shutdown that these two distinctive Westinghouse developments provide in Westinghouse protective and control devices.

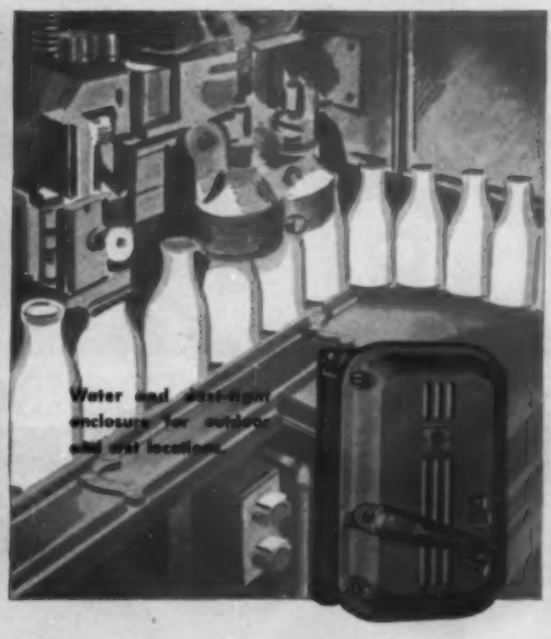
These two features of Westinghouse design insure longer contact life, less need for upkeep and maximum protection for machines and men. Get them in Westinghouse control equipment—use them wherever essential drives must be kept turning! Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

J-21188

THERE'S A "De-ion" MOTOR WATCHMAN FOR EVERY TYPE OF JOB



Standard sheet steel [illegible] enclosure (pedestal-mounted for [illegible] boom switch).



Water and dust-tight enclosure for outdoor and wet locations.

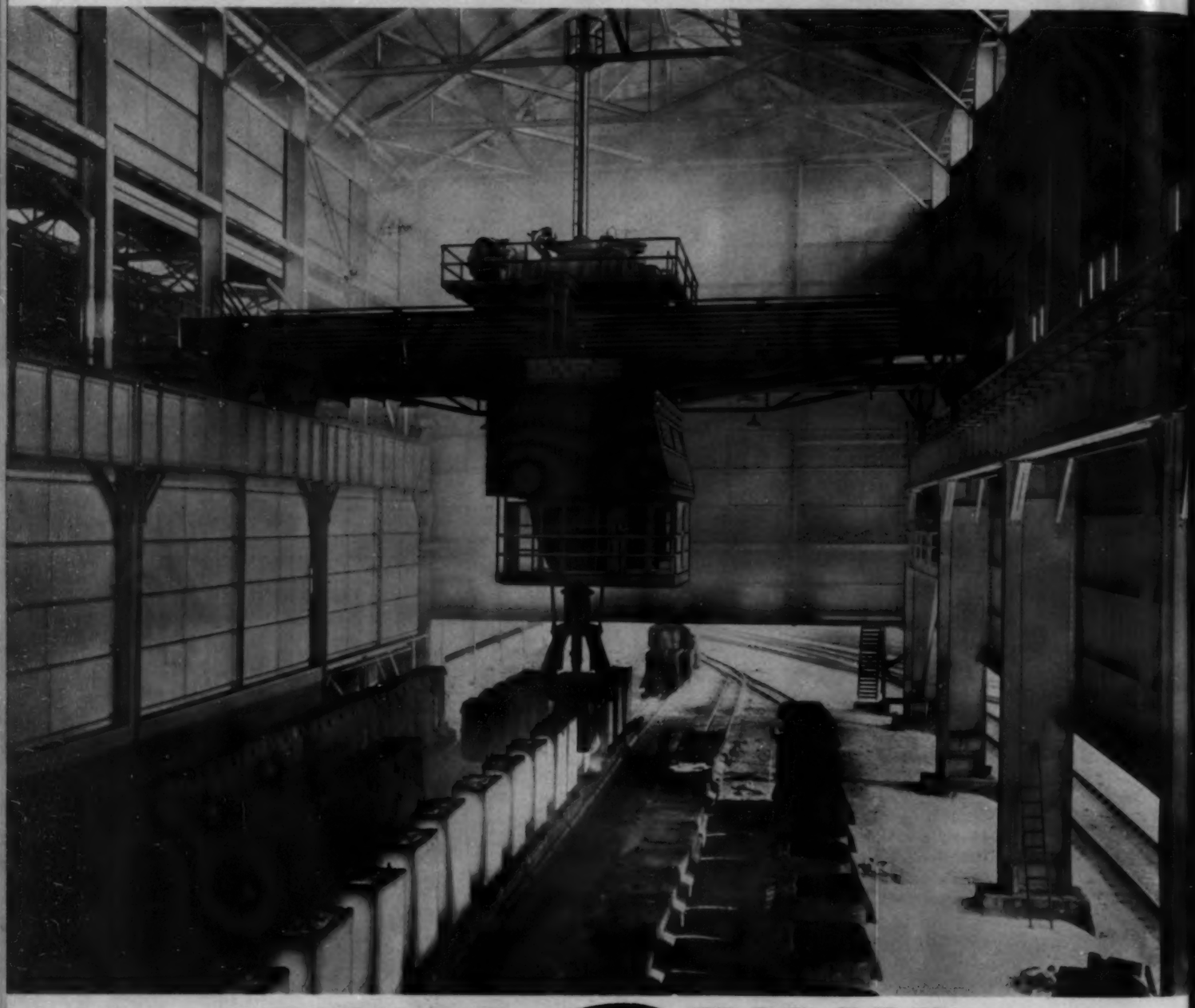
Explosion-protecting enclosure for hazardous locations.

Motors and Control

WESTINGHOUSE

STRIPPING SLAB INGOTS

● Illustrated is one of two Morgan 200-ton, 64′0″ Span Ingot Strippers at work stripping slab ingots (Max. 32″ x 63″ x 72″). Efficient and dependable — such huge machines play an important part in stepping up steel production to meet present-day demands. Morgan Engineers have designed and developed strippers to perform three distinct stripping operations without making changes in the stripping unit. (1) These machines will strip small-end-up or standard ingots (2) Strip big-end-up hot top ingots (3) Break small-end-up ingots loose from stools. With this arrangement it is possible to strip a mixed heat without any lost time.



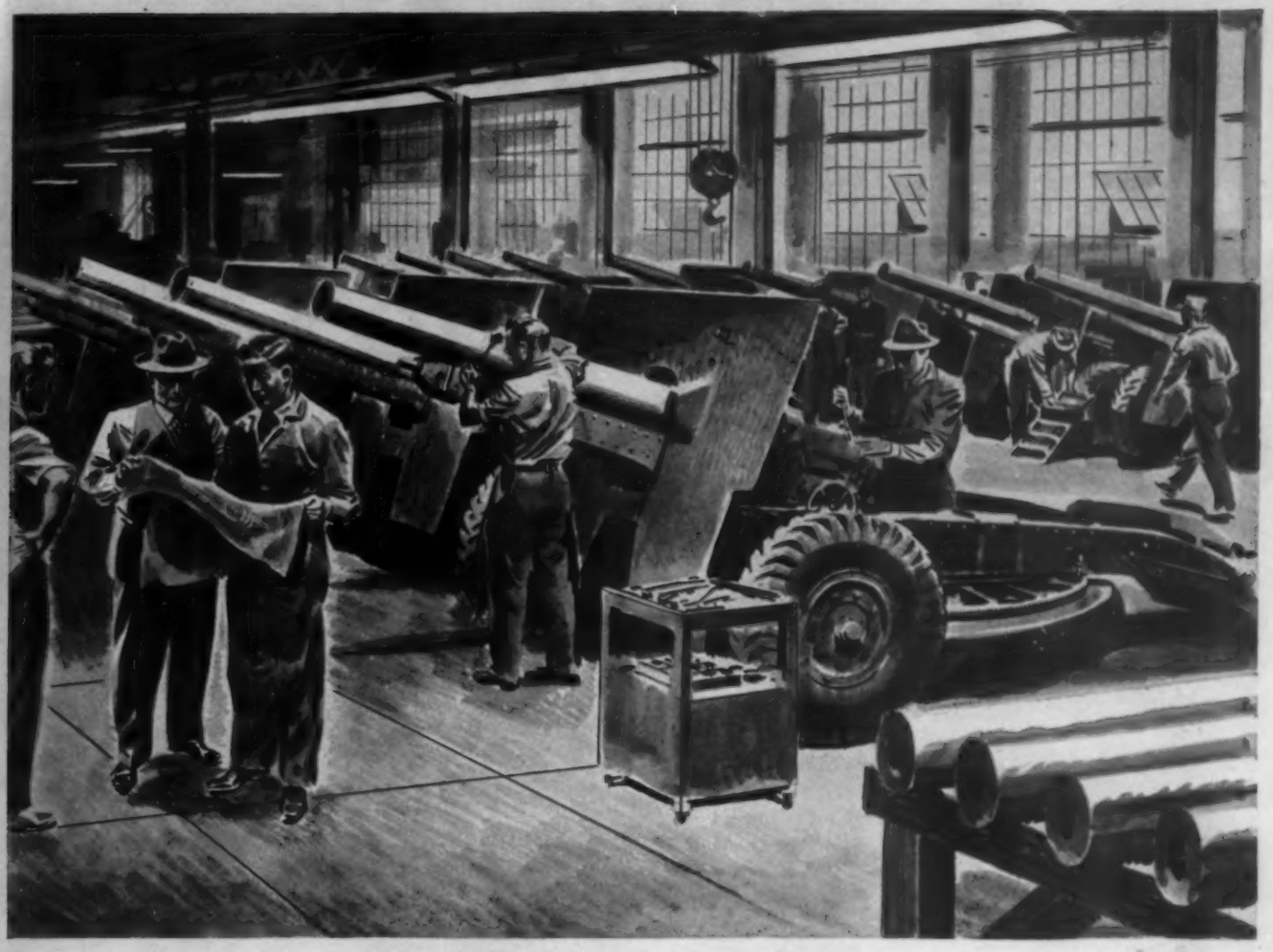
BUILT BY MORGAN *Engineering*

)ESIGNERS • MANUFACTURERS • CONTRACTORS
LOOMING MILLS • PLATE MILLS • STRUCTURAL MILLS
LECTRIC TRAVELING CRANES • CHARGING MACHINES
NGOT STRIPPING MACHINES • SOAKING PIT CRANES
LECTRIC WELDED FABRICATION • LADLE CRANES
TEAM HAMMERS • STEAM HYDRAULIC FORGING
RESSES • SPECIAL MACHINERY FOR STEEL MILLS

THE MORGAN ENGINEERING CO.
ALLIANCE, OHIO, Pittsburgh, 1420 Oliver Bldg.

The problem:

more guns—in a hurry!



and GAS provides an answer with doubled, tripled production!

To fight this war successfully calls for . . . faster, more uniform, more economical production all along the line . . . so that at the earliest possible moment the guns, tanks, planes, trucks and bombs may be right on the firing-line.

It's a price everyone in American industry is only too glad to pay—because we must have victory. Anything else would be intolerable. That means that the Gas industry—with every other industry—is in this war up to the hilt.

The exacting demands of war production have given Gas a tremendous job to do all over this land . . . for production of munitions and supplies for the armed forces, for cooking their meals, baking their bread and heating water, for processing needed chemicals . . . for a hundred essential, urgent tasks. And Gas is doing the job—brilliantly!

Gas engineering has advanced in great strides during recent years. The experience, knowledge and ingenuity of the Gas Industry—plus its grim purpose to help win this war at all costs—is available to help your plant turn out more war materials—faster; to help you keep your gas equipment at maximum efficiency; to make it last longer. Why not call your Gas company—today?

AMERICAN GAS ASSOCIATION
INDUSTRIAL and COMMERCIAL GAS SECTION
420 LEXINGTON AVE., NEW YORK

THE TREND IS TO GAS
FOR ALL INDUSTRIAL HEATING

HOW TO MAKE YOUR FURNACES *Quota Busters!*

Foxboro Potentiometer Controller

The only pyrometer with multiple-drive feature. One motor drives up to 8 instruments. Unique fixed slide-wire contact setting provides knife-edge detection. Large dial permits instant accurate setting.

Foxboro Potentiometer Recorder

Designed in every detail to eliminate lost motion, wear, servicing. Exclusive balancing mechanism; "unbreakable" galvanometer suspensions; ball bearings at important pivots. Also made as combined recorder-controller.

Today's wartime production schedules demand that every furnace in your plant must deliver its daily quota of output. It's no time to risk wasteful re-heats or rejections caused by sluggish or erratic temperature control.

Put your furnaces "in charge" of Foxboro Potentiometer Instruments, and they're equipped to meet or beat their quotas every day! Simpler, more-responsive . . . these precision pyrometers are designed to hold temperatures "on the button" and give *sustained* accuracy, without shut-downs.

Write for Bulletins 202-3 and 190-5 which explain in detail why Foxboro Potentiometer Controllers and Recorders operate closer, more-dependably. **The Foxboro Company, 118 Neponset Avenue, Foxboro, Massachusetts, U. S. A.**

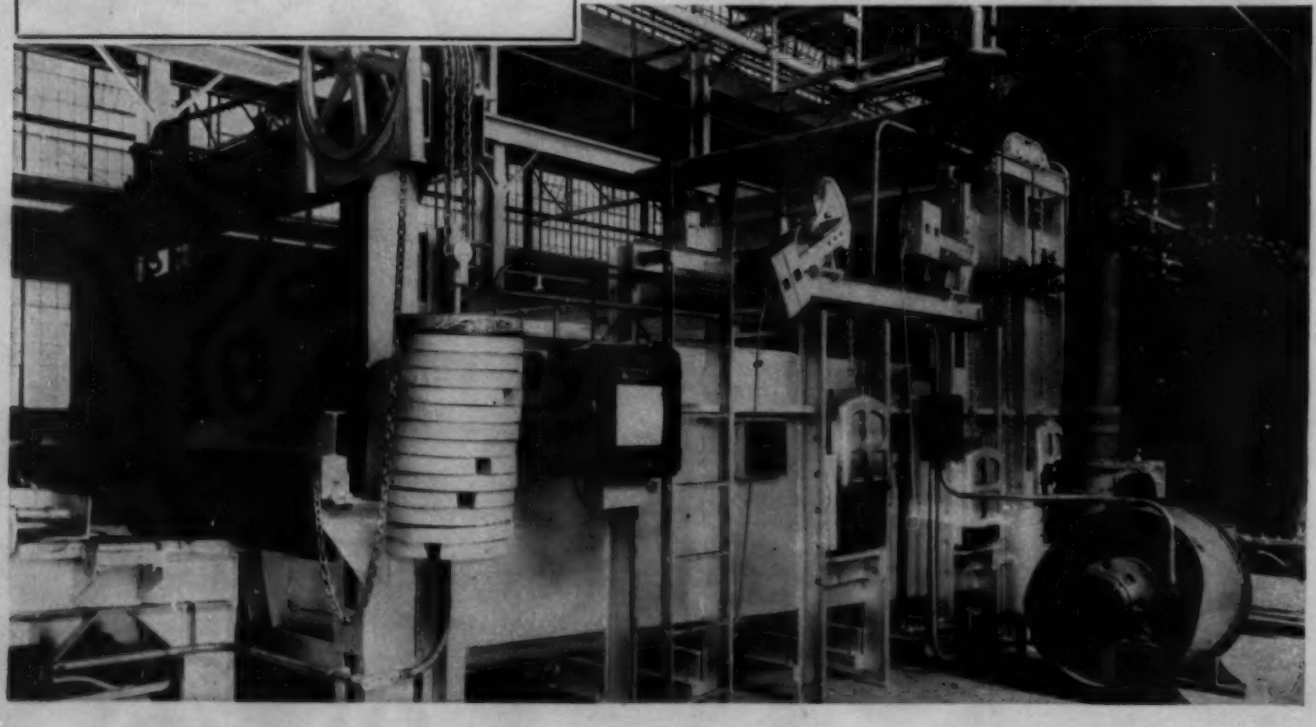
FOXBORO

Reg. U. S. Pat. Off.

Potentiometer Instruments

RECORDING • CONTROLLING • INDICATING

Unvarying temperature, maintained by a Foxboro Recording Controller, equips this oil-fired forging furnace for maximum daily output.



"War-Made Friends"

HACK SAW BLADE USERS and INGERSOLL

* D-B-L

* Produced under exclusive license arrangement with Allegheny-Ludlum Steel Corporation

Other Special INGERSOLL Sheet Steels include:

- Alloy Steels
- Armor Plate
- Clutch Plate Steels
- Tillage Steels
- Soft Center Steels
- Shovel Steels
- Knife Steels
- TEM-CROSS Steel
- IngAclad (Stainless-Clad Steel)
- Stainless Steels and Saw Steels, including "18-4-1" and Molybdenum and D-B-L Hack Saw Steels

In a great many plants Ingersoll D-B-L Steel has made warm friends of those who buy and use Hack Saw Blades . . . In some cases only the necessary conservation of vital alloys gave D-B-L a reluctant first trial . . . Today in these same shops D-B-L is enthusiastically accepted and approved because it is so high in impact resistance, provides so tough a cutting edge, and is so relatively free from decarburization.

These advantages, plus *lower cost*, have won for Ingersoll D-B-L Hack Saw Steel a permanent place along with Ingersoll 18-4-1 and Molybdenum which were pre-war favorites.

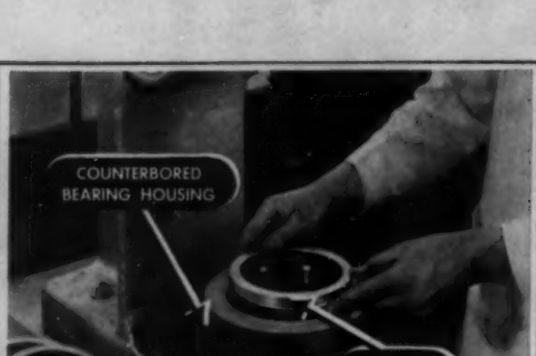
Specify Ingersoll D-B-L Steel on orders for Hack Saw Blades

INGERSOLL STEEL & DISC DIVISION
BORG-WARNER CORPORATION
New Castle, Indiana
Plants: New Castle, Ind.; Chicago Ill.; Kalamazoo, Mich.

INGERSOLL SPECIAL STEELS for SPECIAL USES

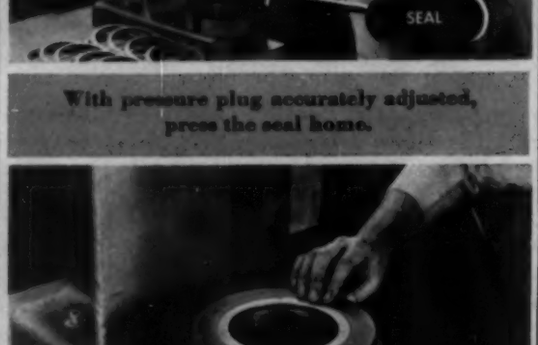
Oil Seals • Dirt Seals • Grease Seals

HOW TO INSTALL FOR MAXIMUM SERVICE



Place seal in position.

With pressure plug accurately adjusted, press the seal home.



Seal in place with upper face flush with the face of the bearing housing.

THE FIRST IN A SERIES OF MESSAGES TO HELP THOSE ON THE INDUSTRIAL FRONT RESPONSIBLE FOR BETTER BEARING PERFORMANCE

The improper installation of an oil seal jeopardizes its efficient operation and also the life of the mechanism it protects. Never use a hammer directly on the face of an oil seal. Never exert an uneven pressure on it in forcing it into the bore of the housing. If possible, the seal should be forced into this bore on an arbor press, using a pressure plug as illustrated.

The outside diameter of the oil seal is finished for a press fit into the counterbored bearing housing. This bore should be wiped clean, all burrs removed, and should be chamfered at the entry end if practicable in order to facilitate the uniform entry of the seal.

The pressure plug should have an outside diameter approximately .010″ smaller than the inside diameter of the bore in order to equalize pressure over the entire face of the seal.

If the seal is to be forced in with its rolled side up, the bearing surface of the driving plug should be slightly concave to limit its bearing only to the turned edge of the seal.

Any questions you may have relative to seals will be promptly answered by Chicago Rawhide engineers.

CHICAGO RAWHIDE MANUFACTURING CO.
1303 ELSTON AVENUE • CHICAGO, ILLINOIS

PHILADELPHIA • CLEVELAND • NEW YORK
DETROIT • BOSTON • PITTSBURGH • CINCINNATI

64 Years Manufacturing Quality Mechanical Leather Goods
Exclusively and now Sirvene Synthetic Products

This machine is a Model Mc-10 and is designed to bend 10 feet of ¾-inch steel plate between the end housings or plate 12 feet 6 inches wide by ⅝-inch thick over the entire length of bed and ram.

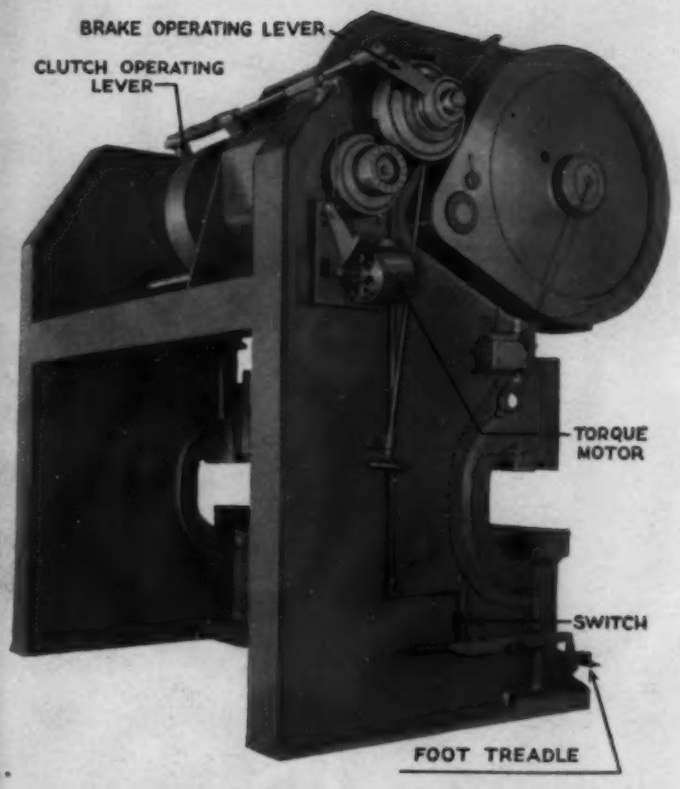
Electrically-operated

CLUTCH *and* BRAKE

...EASES OPERATION

...SPEEDS PRODUCTION

ANOTHER STEELWELD DEVELOPMENT



FEATURES that speed production, lower costs, ease the operator's work, increase machine versatility, etc., are continually being pioneered and introduced on Steelweld Presses.

Now the latest — an electrically-operated clutch and brake mechanism to reduce the fatigue of the press operator by eliminating the usual physical effort required to engage the clutch manually. As a result production can be stepped up considerably.

With the new mechanism it is no longer necessary to keep the foot treadle depressed in order that the clutch remain engaged, although this can be arranged if desirable. Snappy clutch and brake action is obtained which reduces the wear considerably because of decreased clutch and brake slippage.

While Steelweld bending presses of all sizes can be furnished with an electrically-operated clutch and brake, this mechanism is particularly desirable for the larger machines that are used for forming plate of ½" to 1" and greater in thickness. The mechanism can be installed on most Steelweld Presses now in service.

GET THIS BOOK!

CATALOG No. 2002 gives complete construction and engineering details. Mail request for free copy on your company letterhead.

THE CLEVELAND CRANE & ENGINEERING CO.

STEELWELD MACHINERY DIVISION

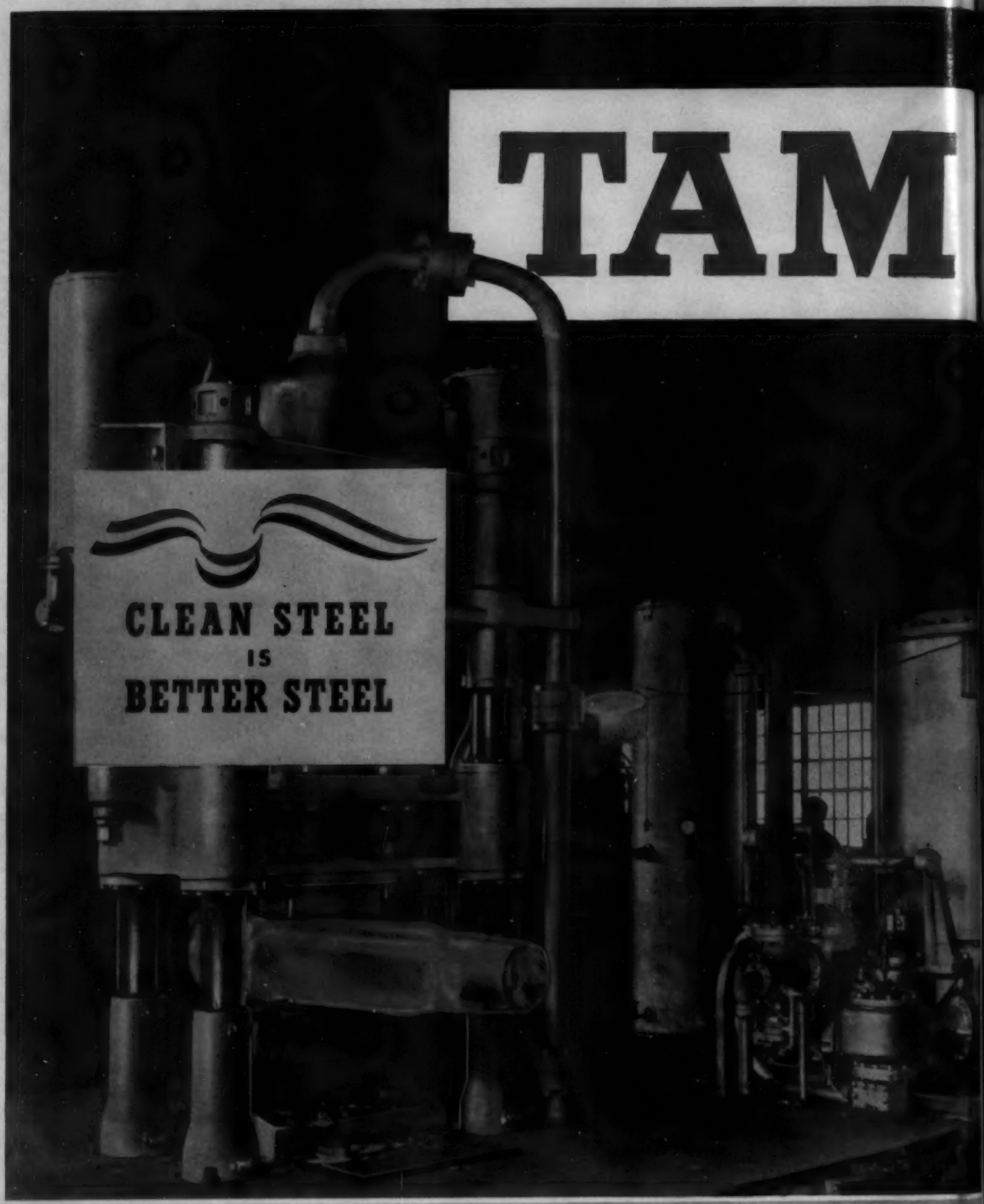
1125 **EAST 283RD STREET • WICKLIFFE, OHIO.**

MANUFACTURERS OF • CLEVELAND CRANES • CLEVELAND TRAMRAIL • STEELWELD BENDING PRESSES

STEELWELD

BENDING PRESSES

GENERAL SALES AGENTS: CYRIL BATH & CO., E. 70TH & MACHINERY AVE., CLEVELAND



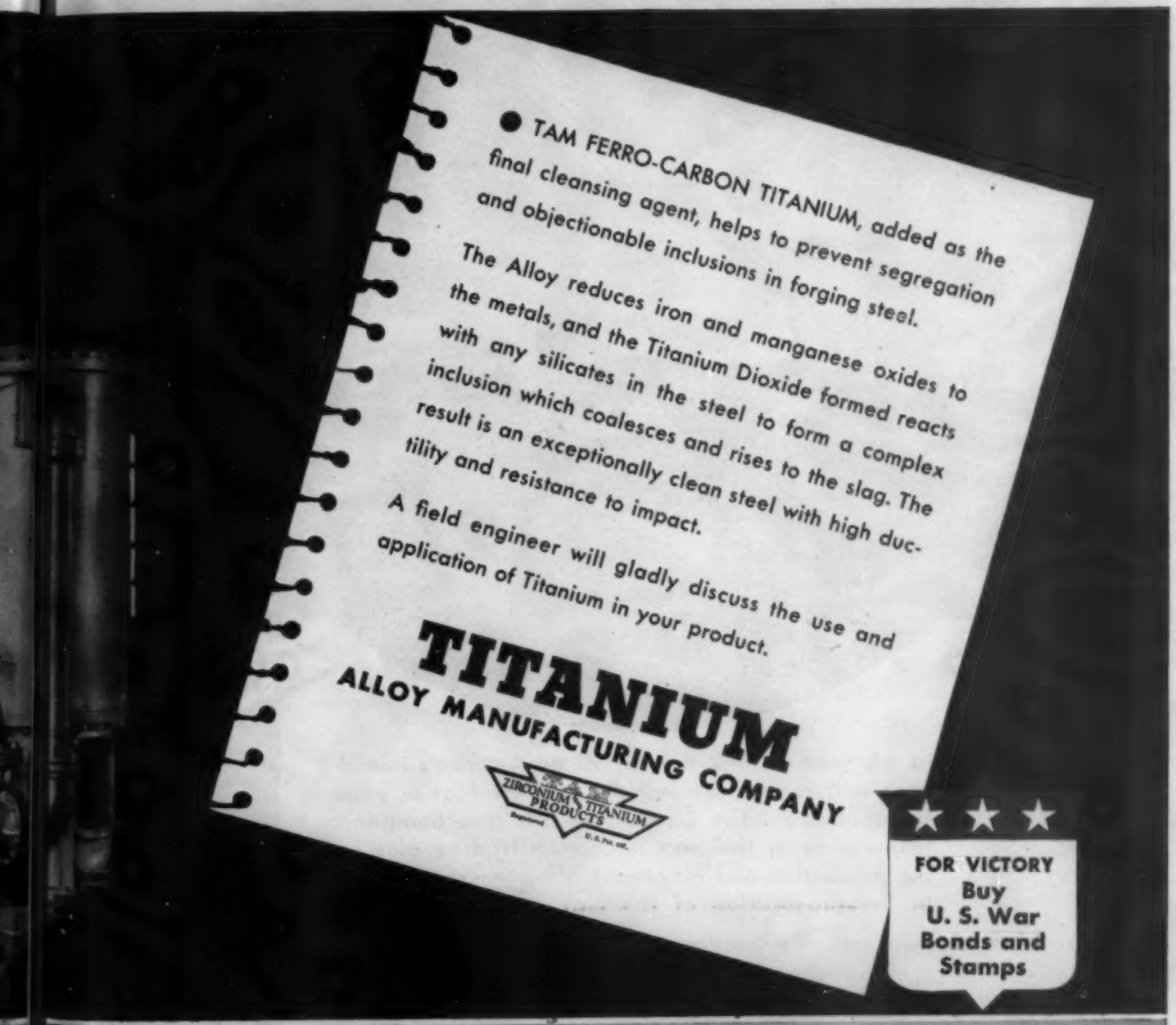
GENERAL OFFICES AND WORKS: NIAGARA FALLS, N. Y., U. S. A.

EXECUTIVE OFFICES: 111 BROADWAY, NEW YORK CITY

FERRO-CARBON TITANIUM

...a better Deoxidizer for

FORGING STEEL


● TAM FERRO-CARBON TITANIUM, added as the final cleansing agent, helps to prevent segregation and objectionable inclusions in forging steel.
The Alloy reduces iron and manganese oxides to the metals, and the Titanium Dioxide formed reacts with any silicates in the steel to form a complex inclusion which coalesces and rises to the slag. The result is an exceptionally clean steel with high ductility and resistance to impact.
A field engineer will gladly discuss the use and application of Titanium in your product.
TITANIUM
ALLOY MANUFACTURING COMPANY
ZIRCONIUM PRODUCTS
TITANIUM
★ ★ ★
FOR VICTORY
Buy
U. S. War
Bonds and
Stamps

Representatives for the Pacific Coast . . . BALFOUR, GUTHRIE & CO., San Francisco, Los Angeles, Portland, Seattle, Tacoma
Representatives for Canada . RAILWAY & POWER ENG. CORP., Ltd., Toronto, Montreal, Hamilton, Winnipeg, Vancouver, Sydney
Representatives for Europe . . . . . T. ROWLANDS & CO., Ltd., 23-27 Broomhall St., Sheffield, England

A FLEET WORTHY OF A MIGHTY FAITH

In this year of 1942 the vessels on America's inland seas will repeat the world's greatest feat in bulk transportation. The Cleveland-Cliffs Iron Company takes pride in the part it is permitted to play in the production and movement of essential materials in the prosecution of the war against the Axis.

THE CLEVELAND-CLIFFS IRON CO.

CLEVELAND, OHIO

Grind 'em Right —and FAST

Drilling operations today must be kept on a continuous production basis. Worn drills, therefore, must be ground *right*—and *quickly!* With drills ground on Sellers Drill Grinders you eliminate under- and oversize holes, because the drills are ground accurately . . . you increase production, because drills remain sharp longer . . . you lengthen drill life, because less material is ground away . . . you cut set-up time on multiple spindle machines since drills are ground to equal lengths and sets of drills can be replaced without individual spindle adjustment . . . and production is speeded up, because *accurate* drilling requires no bushing or reaming.

WILLIAM SELLERS & CO.
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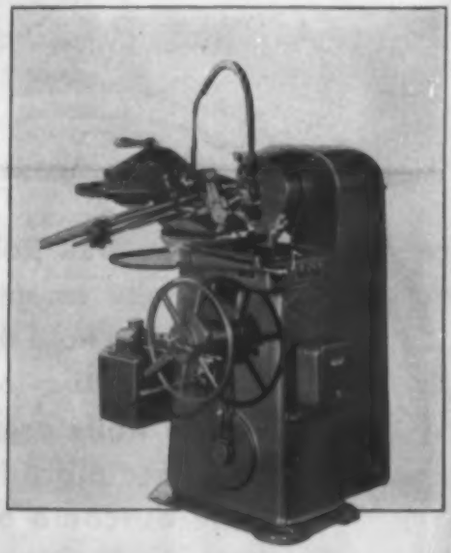

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Lewis Tube Mill Rolls give an exceptionally smooth finish to the work and hold their size far beyond the usual expectancy. All Lewis Rolls are manufactured under procedures which are the outcome of years of experience. They give ultimate satisfaction in the mills.

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Alert to the urgency of uninterrupted production, vital heavy metal working industries made Cardox one of their war weapons. Large installations of fully automatic Cardox Systems have been selected by plants of this kind.

At first glance, the fire hazard may not seem as severe in these plants, as it is in other industries. However, the individual hazards indicated above show how steel production could be blacked out by accidental fire.

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NON-DAMAGING FIRE EXTINGUISHING SYSTEMS

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An A-C ELECTRODE

IN ALL POSITIONS

THE GENERAL ELECTRIC ELECTRODE "W-26"

NOW through the development of the W-26 electrode you can extend the advantages and convenience of *high quality* a-c welding to all positions—both VERTICAL and OVERHEAD as well as flat and horizontal.

Developed by General Electric Welding Laboratories to meet the demands of industry, this a-c electrode complies with the following specifications:

- A.W.S. Filler Metal Specification E6011
- Navy Bureau of Ships, Specification 46E3, Grade 111, Class 1
- A.S.M.E. Boiler Code, Paragraph U68

X-RAY PHOTOGRAPH of weld made with the W-26 reveals high quality of deposited metal. Note the smooth, uniform appearance and complete absence of gas pockets, slag inclusion, and undercut.

OPERATING CHARACTERISTICS

In operating characteristics and quality of the finished weld, W-26 is superior to other all-position a-c electrodes heretofore available and is equal to the best direct-current electrodes used for mild-steel work. It provides a strong, forceful arc, free from magnetic blow, and enables operators to make finished welds with good fusion and excellent penetration.

PHYSICAL CHARACTERISTICS

The following table reflects average results obtained from all-weld-metal specimens, tested "as-welded"

Physical Properties of Deposit	5/32-in. Diam	1/8-in. Diam
Ultimate tensile strength, lb per sq in.	72,500	72,000
Yield point, lb per sq in.	60,000	62,000
Elongation in 2 inches, per cent	25	25
Reduction of area, per cent	46	46

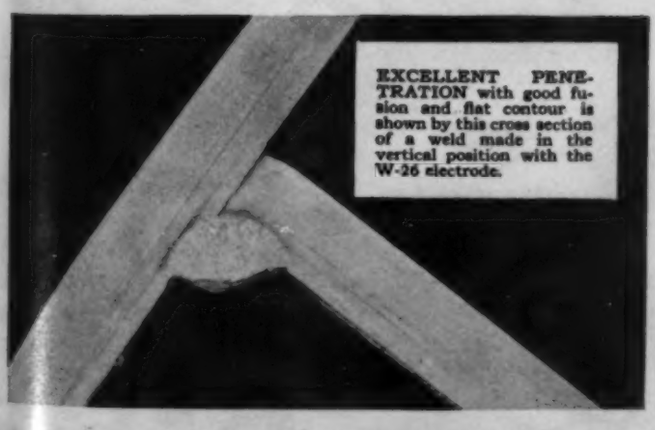
(The W-26 electrode is now available in 1/8 in. and 5/32 in. diameters. Other sizes, from 1/16 in. to 1/4 in. inclusive, will be made available as soon as possible.)

USERS to whom the W-26 has been submitted report especially favorable results. For example, Mr. R. Kraus, Welding Engineer of Stacey Brothers, Cincinnati, Ohio, says "—with these electrodes average welders can weld vertically and overhead at an equal output as with direct current and reverse polarity. This is a decided advantage for our type of work." Mr. E. H. Dunkman of the United Welding Co. reports "—this appears to be the best all-position a-c electrode we have ever tried—metal lays smooth with little or no undercutting."

For further information and samples of the W-26 electrode, get in touch with your nearest G-E arc-welding distributor or write your nearest G-E office. General Electric, Schenectady, N. Y.

SURFACE APPEARANCE of welds made with this a-c electrode is unusually good. Operators state the W-26 is easy to use—provides a strong, forceful arc—slag is easily removed from finished welds.

FIRST-CLASS WELDING in the overhead position is easily accomplished with the W-26 A-C electrode.


EXCELLENT PENETRATION with good fusion and flat contour is shown by this cross section of a weld made in the vertical position with the W-26 electrode.

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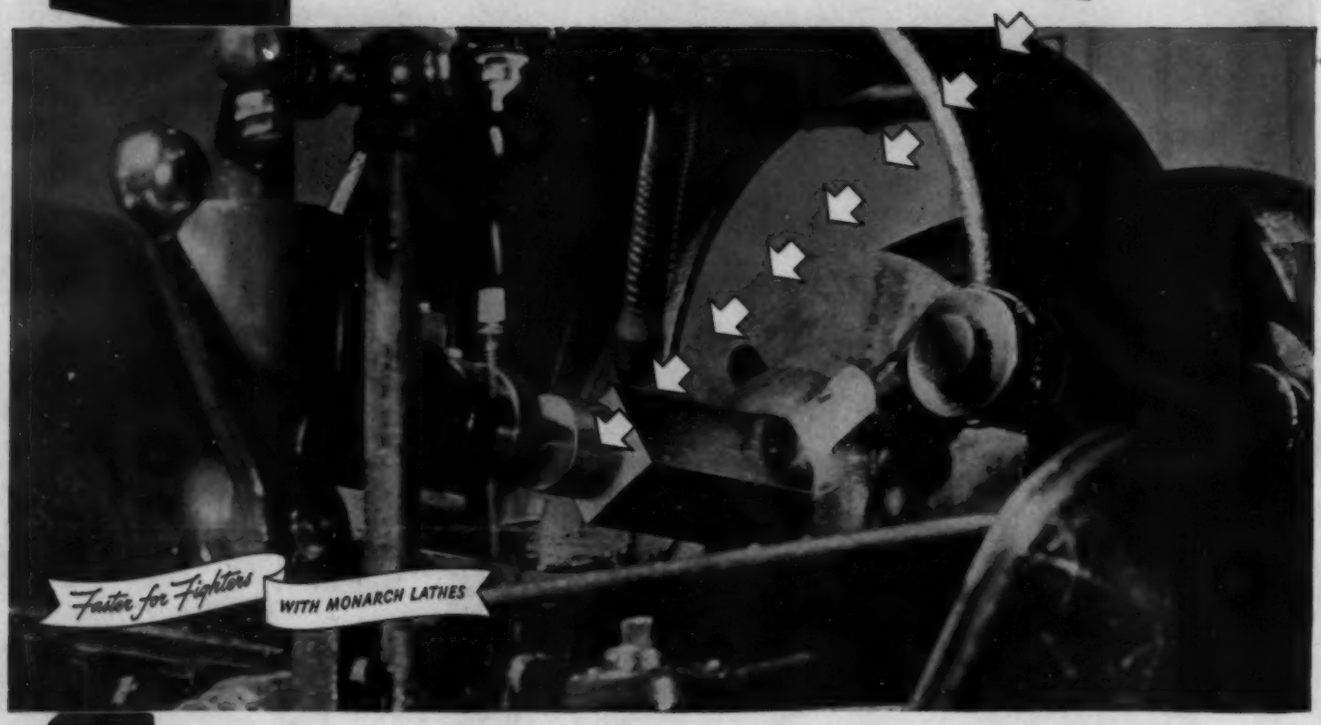

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Yet the same lathe that takes, without flinching, these rough interrupted cuts performs the finest of finishing operations with unfailing accuracy.

Therein lies much of the utility of Monarch Lathes of today—which you can continue to depend upon to do your turning work—tomorrow.

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MONARCH LATHES

COVER THE TURNING FIELD

Electromagnetic method reveals defects in heat-treated parts. See Page 70

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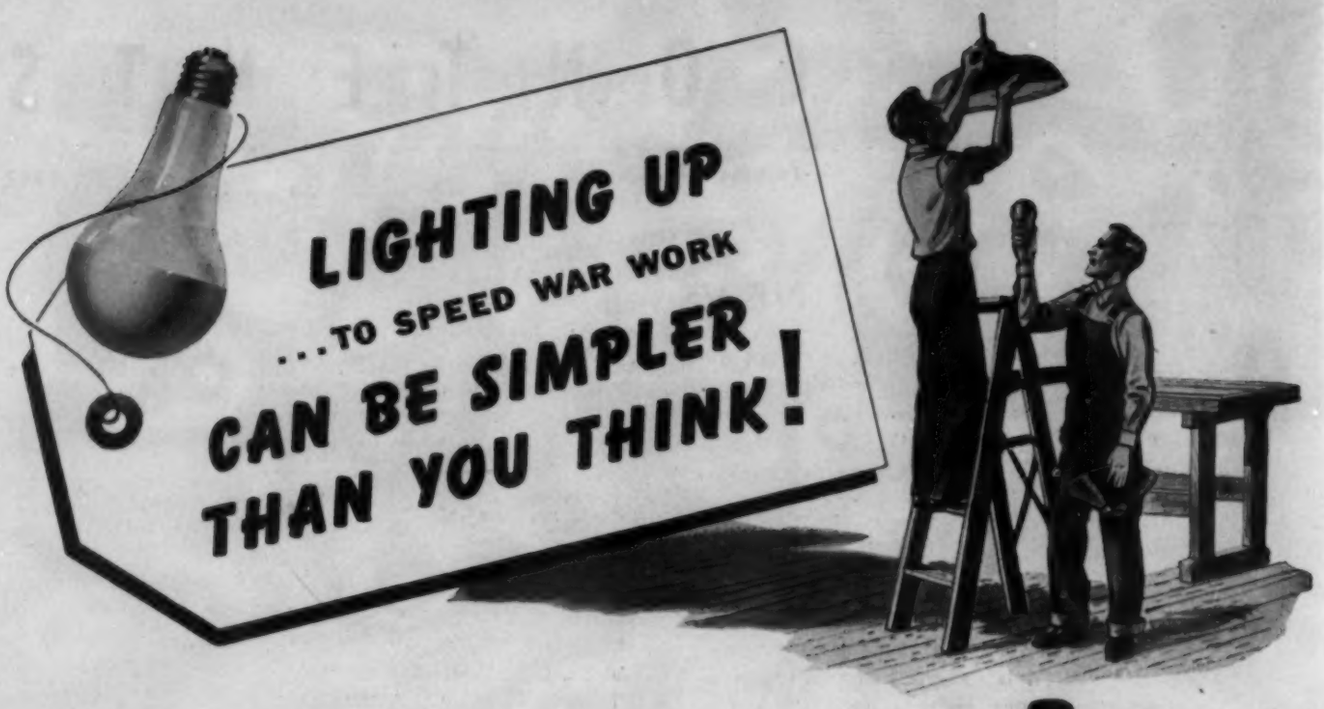

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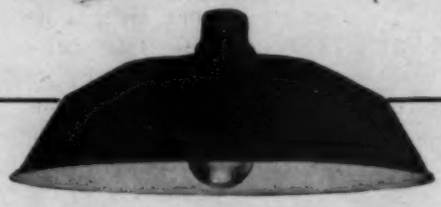

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HIGHLIGHTING

this issue of STEEL

NEWS National War Labor Board's decision in the "little steel" case is not likely to please anybody—and it certainly does not serve to advance in any way the cause of a stabilized labor policy (p. 42). E. L. Shaner, STEEL'S editor-in-chief, cites the decision as another example of government by expediency (p. 41).

Now that war production is approaching peak volume, Donald M. Nelson (p. 60) stresses the danger of paring "our civilian economy down too fine". This is the first encouraging word that has been given to non-war manufacturers in many months. People must be fed and housed, says Mr. Nelson, they must get to and from work, they must have the varied kinds of equipment with which their work is done.

A most disquieting situation looms in reference to the scrap supply, with a pinch likely to come as early as October (p. 115). News of the results of the present salvage campaign, therefore, is awaited with utmost interest. . . . Germany also has a salvage program under way but is going about it in a somewhat different way (p. 52); Hitler has turned the job over to the Gestapo which forces compliance "or else" . . . . Predictions that the Nazis will be defeated because of shortage of fuel are misleading declares B. B. Williams (p. 57).

PRODUCTION War work now employs approximately 12,000,000 persons and this total is to be stepped up to about 17,500,000 by the year's end. A serious shortage is seen ahead (p. 66).

Steel ingot output last week rose half a point to 98 per cent of capacity (p. 47). Structural steel fabricators are turning to other types of production (p. 115).

SUBSTITUTION Sponge iron is an inferior substitute for steel scrap, the processes by which it could be produced are costly and inefficient and still in the experimental stage, and establishment of sponge iron plants would be wasteful in the overall production effort. That is the studied opinion of the Advisory Committee on Metals and Minerals in a report to the War Production Board (p. 45). The report blasts completely the proposal of the Bureau of Mines to initiate a pilot plant program.

Steel has been found to be suitable for production of shell cases, says the Secretary of War (p. 52). Ford Motor Co. reports progress in development of steel castings for aircraft and aircraft engines (p. 60). Substitution of antimony for tin is encouraged (p. 56).

Fiber containers now are being made on machines which normally make tin cans (p. 108).

PRIORITIES Special electrical specifications for machine tools are banned (p. 55). Manufacture of powered materials handling trucks is restricted. Additional industry advisory committees have been established in the metalworking field (p. 54). The Smaller War Plants Corp. has been staffed.

Effect of the Allocation Classification System on brass and bronze foundries is explained (p. 56). Additional uses of tin and terne plate have been authorized.

The only priorities plan that has worked is that involving steel plate allocations; the features of this plan should be applied generally, reclares A. S. Harms (p. 50).

Further depletion of steel warehouses makes it difficult for more war manufacturers to procure needed steel (p. 105).

TECHNICAL American industry is developing many shortcuts to speed war production work and many companies are doing everything they can to spread their "know how" so other companies can speed their work, too. More than a score of such developments (p. 70) were demonstrated by Westinghouse recently.

Flame hardening is one of the newer production methods that are being used to increase production of war material. It has many advantages for cylindrical parts, both on external and internal surfaces. Stephen Smith presents possibilities of the various procedures developed for such work and explains (p. 76) their range of application.

Nonmetallic composition bearings for steel mill service have been improved greatly since their introduction some ten years ago, so now they find many applications in steel mill service (p. 78) where they reduce power requirements, permit rolling more uniform section of product, reduce maintenance costs, according to Frank W. Vogt.

R. F. Wyer tells how to keep your welding machines welding. His tips on an effective maintenance program (p. 88) can do much to help locate trouble and remedy it as well as to prevent it from occurring in the first place. With the present difficulty of obtaining equipment, maintenance information is more important than ever before.

More Plants to Help You Speed War Production

Men and Machines Available Immediately for Contracts or Sub-Contracts

More Middle Western and Eastern companies are continuing to list their available war production plant facilities with Inland Steel Co. Some of these facilities are summarized below to help bring the manufacturers in contact with "prime" contractors or Government agencies, and thus speed all-out war production.

Write or wire Inland for the names and addresses of any of the plants listed. We suggest that you get in touch with us, even if the plants and manufacturing equipment you require are not listed on this page, as we will gladly forward to you our entire list if you are interested.

IS-56 Wis. farm mach. mfr. has over 64,000 sq. ft. mfg. sp., including gray iron fdry. with 15 moulders. Excellent shipping facilities. Emp. 85 men—could operate two shifts. War work desired on machining and assembling. 15,000 sq. ft. warehouse fl. sp. Equipment includes: 4 turret lathes, 3 engine lathes, 48" boring mill, 24" planer, milling machine, shaper, drill presses, arc and spot welders, complete metal working shop and punch presses.

IS-57 Neb. sheet metal products jobber and agricultural equip. mfr. desires war work. Nearly 18,000 sq. ft. fl. sp. with 20 to 60 emp. General sheet metal shop includes all types of welding equip. working 28 ga. to $\frac{1}{16}$", also other small fabrication. Equip. includes bending brakes, sq. and cir. shears, punch presses, beaders, rollers, bar folders, seamers, grinders, drill presses, air compressors, etc.

IS-58 Wis. sheet metal automotive stamping and specialties mfr., has over 14,000 sq. ft. fl. sp. and emp. 35 men per shift. Equip. includes Rockford straight side and open face presses—70 ton cap. 7" stroke, 2-30 ton cap. 5" stroke, 2-15 ton cap. 2" stroke; flywheel presses, 1-12 ton 6" stroke and 1-12 ton 1½" stroke, 1-15 ton 1" stroke; electric seam and spot welders, engine and bench lathes 16" and 9" swing, step-toe shaper 12" stroke, slitter milling mach., drill presses, grinders, air comp., shears, metal forming rolls, brakes and cir. saws. Complete tool room for making own tools and dies.

IS-59 Ohio mfr., two factory buildings over 60,000 sq. ft.; 250 emp. Has complete facilities for war contract work. 2—No. 4 punch presses 3" stroke; 1—No. 5 punch press 3" stroke; 1 Bliss Consolidated 4" stroke; 3 Sheridan embossing presses; 1 Bliss punch press 2" stroke; other equipment includes 1—6' hand metal brake; 1 Rosback hole punch press 27", 1—6' Niagara power shear, 54 Singer sewing machines power driven; 1 Union special power driven sewing machine, 1 Bliss metal slitter; 1—12" power driven cut-off saw, 1—10" power driven rip saw; color work equipment; spray guns and silkscreen equipment.

IS-60 Ohio mfr. equip. for making light and medium weight gray iron and semi-steel castings up to 200 lb. each. Plant covers over two acres, active over 42 yrs. Has capable staff, desires war work subcontracts.

IS-61 Ind. struct. steel shop and gray iron fdry., 60,000 sq. ft., 140 men, 18—3 ton elec. hoists, 1 Ryerson friction saw cuts 24" beams, flame cutting equip., 2—angle shears cap. 6 x 6 x ½" angles, 2—wide flange beam punches, 4—punches for angles and flats, 1—sheet shear cap. $\frac{3}{16}$" x 10', 2 plate shears 48 x ½", 2—electric rivet heaters, 2—Hanna riveters, rivet hammers, drill presses, reamers, 1—Ingersoll Rand air comp., 1—Cincinnati press brake cap. $\frac{3}{16}$" x 12', misc. equip. incl. pipe cutting and thread machine, metal bandsaw, bar shear, etc. Foundry making gray iron castings 5 lb. to 1000 lb.—cap. 7½ tons per day.

IS-62 Mich. machy. and fdry. plant has available approx. 400 man hours per month for broaching medium and heavy broach jobs. Machine has 10 ton cap. up to 12" wide, 60" long—latest hyd. type capable of producing most accurate kind of surface broaching possible.

IS-63 Wis. refrigerator mfr. needs war work subcontracts. Over 158,000 sq. ft. fl. sp., incl. warehouse; employing 350. Sheet metal shop handling anything up to 16 ga., good shear and folding equip. including all kinds of welding units, conveyorized high-bake ovens, and complete wood working dept. Facilities include punch and drill presses; squaring and cir. shears; press, bending and box brakes; wood planers; cut-off, band rip and variety saws; moulders; boring mach.; shapers; jointers; riveters; arc, gun and spot welders; milling mach.; surface grinders; lathes and hack saws.

IS-64 Nationally known (Ill. and Pa.) mfr. of electro-plated metal sheets and coils. Complete facilities for plating and polishing, with over 89,000 sq. ft. fl. sp. and nearly 300 emp. Handling steel, zinc, brass, copper, tin plate, aluminum—sheets, coils, strip, flat wire all sizes, gages and tempers. Equip. includes electro-plating generators, sheet buffing machines, coil buffing machines, 8' 16 ga. sq. shears, 4' 16 ga. sq. shear, No. 1 Waterbury Farrell rotary shear, 16 ga. 24" rotary shears, Hallden 26" leveler and auto. shear, grinders for engravers plates, combination sheet and coil lacquering unit, $\frac{1}{16}$" crimp 50" crimping mach., $\frac{1}{16}$" crimp 38" crimping mach., scoring mach., nickel solutions, copper, chromium and brass solutions.

IS-65 Wis. structural steel plate and ornamental fabricator, employing 150. Has 37,000 sq. ft. fl. sp. for war work subcontracts. Structural shop equip. incl. 15" and 40" cap. punches, 12' bending rolls, 6' sq. shear $\frac{1}{16}$" cap., 6' brake No. 10 cap., high speed shear No. 10 cap., 20" and 36" plain drill presses, No. 2 and No. 3 Spindle Barr drill presses, 7 welders, 7" hack saw, 4" angle roll, grinders and misc. hand tools. Mach. shop has: No. 2 spindle drill press, Flather shaper 12", 3' and 4' radial drill presses, No. 3 and No. 25 universal mills, 20" single spindle drill press, 3 Monarch lathes, 26" planer, 6" cap. pipe machine, Millholland turret lathe, New Haven lathe 36"—10' bed, Davis Key seater, and Racine power hack saw.

IS-66 Nationally known Mo. stove mfr. desiring direct or subcontract war work, with complete equip. for metal forming incl. punch presses, brakes, and shears, also prepared to do heat treating. Large cap. for gray iron work up to 500 lbs. per unit. Approx. 300,000 sq. ft. of sp. on R. R. siding.

IS-67 Ind. structural steel fabricating plant desires war contracts or sub-contracts. Able to begin work at once. Complete fabricating shop, blacksmith shop, templet shop and two warehouses. Thirty-eight years' experience in light, heavy riveted and welded structures. Facilities for punching, shearing, forming, bending, riveting and welding. Small mach. shop equip. Ample room for receiving and shipping or outside fabrication and assembly.

IS-68 Southern Mich. agricultural & hdwe. spec. mfr. with 30,000 sq. ft. fl. sp., wants sheet metal or assembly work. Equip. incl. elec. punch presses, and power shears—14 ga. cap. all widths; high speed spot welders. Sheet metal shop incl. rollers, brakes, folders; tin shop; soldering frcs.; modern paint lacquer spray booths. Ample storage, own RR siding. Capable staff and ample labor.

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AS THE EDITOR VIEWS THE NEWS

STEEL

July 20, 1942

GOVERNMENT BY EXPEDIENCY IS OUR GREAT WEAKNESS

For months the House Ways and Means Committee has been working hard to draft a revenue bill. It has considered recommendations of the Treasury department, heard arguments by representatives of taxpayers and weighed the desires of the Executive branch of the government.

From time to time it appeared that the committee was making progress in its effort to produce a sound, equitable bill. But on Tuesday it approved and reported to the House a measure so horribly mutilated by last-minute changes that many of its sponsors could scarcely recognize it.

Commenting on this mutilation, Representative Harold Knudson of Minnesota said: "It is no longer any secret that the present formula was arrived at through a series of trades and shameless logrolling. In all my years on the Ways and Means Committee I have never seen anything like it."

Mr. Knudson's sharp rebuke is deserved and timely. It applies not only to the tax situation but also to the attitude of the national government on many current problems. In effect, he was charging that the tax bill was built on a framework of expediency. He could have added that we are living under a government which governs almost everything by expediency.

Unfortunately, another example of government by expediency came to attention shortly after the tax bill was reported. It was the decision of NWLB in the "little steel" case. The board awarded the steelworkers less than half of their requested $1 a day increase in wages, but granted "union security" in the form of a maintenance of membership clause and the check-off. In the case of the employes of two companies, a minimum daily wage guarantee was granted.

This decision, like the reported tax bill, is the product of compromise and expediency. It will not satisfy anybody. The wage grant, like the revenue measure, is retroactive — in itself an evidence of delay, indecision and neglect of the public's interests.

Another disheartening illustration of expediency is the manner in which Leon Henderson's lone and gallant fight against inflation is being sabotaged by pressure blocs and by executive leniency.

This nation has reached a stage in this emergency where expediency no longer is a virtue. The time has come for a strong stand on taxes, wages and prices.

E. L. Shaner

Editor-in-Chief

WLB "Stabilizes" Steel Wages by Directing Compromise Increase

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Action contradicts President's anti-inflation program . . . Maintenance of union membership and check-off granted to USA in four independent companies . . . New demands expected to develop as result of decision

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WASHINGTON

A FEW more holes were shot through the administration's anti-inflation program last Thursday by the National War Labor Board which directed a 44-cent daily wage increase for 157,000 employes of four "Little Steel" companies.

The board also recommended "maintenance of membership" for the United Steelworkers of America—CIO. Maintenance of union membership has been assailed by the steelmakers as the closed shop in camouflage.

To further insure the financial security of the union, the board also granted the check-off.

The WLB's decision generally was viewed as a major battle lost on the home front by anti-inflation-minded officials. It was a blow to OPA Administrator Henderson's efforts to maintain price ceilings. It was considered to be a repudiation of one of the seven points contained in the President's program to prevent runaway inflation.

If the four companies against whom the decision is directed accede to the board's recommendations, it appears probable that the remainder of the industry will be forced to grant similar increases. This will affect about 400,000 more employes.

A pattern will thus be set for determining the demands of automobile workers whose case is pending before the board. Then the aviation workers, and so on, until the increase becomes general.

Steel—with the automotive industry—long has been the bellwether in the establishment of wage rates. Wage increases granted by the steel industry inevitably are followed by comparable advances in other industries. This happened in 1936, 1937 and 1941.

Actual cost to the "Little Steel" companies—Bethlehem Steel Co., Republic Steel Corp., Youngstown Sheet & Tube Co. and Inland Steel Co.—will not be great. Although the wage increase will total $21,000,000 annually, 90 per cent or more of this amount will come out of federal profits taxes, as pointed out by the board's fact-finding panel.

For the steel industry as a whole, assuming the increase becomes general, the cost will be about $70,000,000 yearly.

If the increase spreads to all wage earners, the total increase in wage costs will approximate $4,000,000,000, the major portion of which will be deducted from the federal government's revenues.

Thus the gains of the wage earners will in large part become an added burden to persons with fixed incomes, already hit by increased taxes and higher living costs.

The recommended wage increase, which will be retroactive to the date of certification of the case to the board last February, will raise the minimum hourly rate to 78 cents from the present 72½. Basic daily wages will be increased from the present $5.80 minimum to $6.24.

Average steel wages in May were 101.1 cents an hour, or $40.44 for a straight 40-hour week. The new rates will be about 106.6 cents, or $42.64 for the straight 40-hour week.

The board's fact-finding panel in reporting to the full board several weeks ago found that the average steelworker's income in 1941 was $1926.72 and held that the union "has not sustained its contention that wages in the steel industry are inadequate."

The union originally asked for $1 a day increase and the closed shop. When rumors of the "compromise" settlement leaked out last Wednesday morning through "authoritative sources"—in advance of the board's official announcement on Thursday afternoon—CIO leaders bitterly at-

"Do you work for wages? You will have to forego higher wages for your particular job for the duration of the war."—President Roosevelt, April 28.

"The government of the United States will not order, nor will Congress pass legislation ordering the so-called closed shop."—President Roosevelt, Nov. 14, 1941.

tacked those government officials who had been attempting to prevent inflation. Henderson particularly was on the receiving end of the union's criticism.

"OPA Administrator Henderson," read one earlier CIO release, "instead of playing shortstop on the President's anti-inflation team, tried to play first, second, third, pitcher, catcher and coach. One day he appeared as an expert on taxation; the next day he fired salvos of statistics at the War Labor Board, attacking labor's request for wage increases to keep up in a measure with the rising cost of living . . . He has yet to devote equal attention to excessive war profits and bloated personal incomes."

On Wednesday, after intimations of the board's decision had been published in the newspapers, Philip Murray, head of the CIO and of the United Steelworkers, accused Mr. Henderson of seeking to take over wage-fixing powers from the WLB and warned that labor has "not yet given up its power to bargain for a fair living pay."

Mr. Henderson, incidentally, opposed the inclusion of wages in the price-fixing bill when that measure was before Congress and repeatedly has asserted that wages should not be frozen. Logically, he also has argued against widespread general increases in wage rates at a time when prices of commodities are frozen.

"Unless wages are stabilized—that is to say, unless wage adjustments are limited to remedying sub-standard and inequitable conditions—cost of living cannot be held."—Leon Henderson, June 5.

"Terminal" for Present Ratio of Wages, Prices Sought by Board

William H. Davis, WLB chairman, called the decision a "wage stabilization policy which is based on maintaining the purchasing power of the hourly wage as of January, 1941. He added that it will "lead to a 'terminal' for the present ratio between wages and prices."

The board's opinion on the wage issue was written by Dr. George W. Taylor, vice chairman, and sets forth five "guiding principles." The vote on the wage issue was 8 to 4, with the labor members dissenting.

On the union security provision, the employer members dissented. This provides that workers who do not wish to be bound by the maintenance clause and the check-off will have 15 days in which to resign from the union.

By unanimous vote, the board recommended a guaranteed minimum daily wage.

Dr. Taylor outlined the five guiding principles as follows:

"In full recognition of its grave responsibility to the nation, and for reasons later detailed in this opinion, the National War Labor Board has determined that the following guiding principles should be applied in evaluating claims for wage increase:

"1—For the period from Jan. 1, 1941, to May, 1942, which followed a long period of relative stability, the cost of living increased by about 15 per cent. If any group of workers averaged less than a 15 per cent increase, the hourly wage rate during, or immediately preceding, or following this period, their established peace-time standard has been broken. If any group of workers averaged a 15 per cent wage increase or more, their established peace-time standard has been preserved."

"2—Any claim for wage adjustment for the groups whose peace time standards have been preserved can only be considered in terms of inequality or sub-standard conditions specifically referred to in the President's message of April 27, 1942.".

"3—Those groups whose peace-time standards have been broken are entitled to have these standards re-established as a stabilization factor.

"4—The board, as directed by the President in his April 27 message, will continue to 'give due consideration to inequalities and elimination of sub-standards of living'.

"5—Approximately 20 wage disputes, still pending before the board, were certified prior to the stabilization date of April 27. The question arises in these cases whether wage rates being paid on April 27, 1942, can or cannot be considered as 'existing rates' within a meaning of the President's message or whether they then had the tentative character of the disputed rates. Due regard must be given to any factor or equality which would be arbitrarily exempt by 'a change of rules in the middle of the game'.

"The guiding principals outlined above insure in general that the claims for wage rate adjustments can be considered on an equitable basis and in a manner which will further the national purpose to stabilize the cost of living".

Dr. Frank P. Graham, public member, wrote the board's opinion on the union security issue. He pointed out that the check-off provided by the board was voluntary since any member of the union had 15 days during which time he can resign, rather than be bound by the check-off, and still keep his job.

"At present, the company forbids the collection of dues on company property, and provides no facilities anywhere for this purpose," he stated. "The problem is further accentuated by the difficulties and complications of many different nationalities and races among the workers, and the widely separated and far-flung locations of mills and homes and the limits of transportation. Since some of the companies make deductions for several other authorized items, due to the agency and causes in which the company believes or has an interest, steelworkers often have the impression that the companies are opposed to the union because they do not check-off dues to the union.

"The check-off eliminates the picket line for collecting dues and their attendant abuses. The check-off will save the time of the union later, for settlement of grievances and improvement of production. In

"The fight against inflation must go hand in hand with the fight against the Axis itself. . . Businessmen will have to be contented with low reasonable profits. Workers will have to forego wage increases, except in cases of sub-standard wages or inequities. Farmers will have to accept a ceiling on their prices at parity. . . All these things must be done together. No one of us can take the attitude, "It's the other fellow who must sacrifice first".—Donald M. Nelson, June 12.

sharing by the company and the union of their common problem there are responsibilities for self-discipline and efficient production, through the maintenance of a stable membership and the prompt collection of union dues. This makes for a better and more co-operative company, and a more responsible and more co-operative union.

"The time, thought and energy given tense struggle for organization, maintenance of membership, and collection of dues, necessary and educationally valuable as they are, should as fairly and wisely as possible now be concentrated on winning the war. The intense struggle to maintain the labor union should, by a stabilization of the union, give way to the larger struggle to maintain the American union as the hope of freedom and peace in the world."

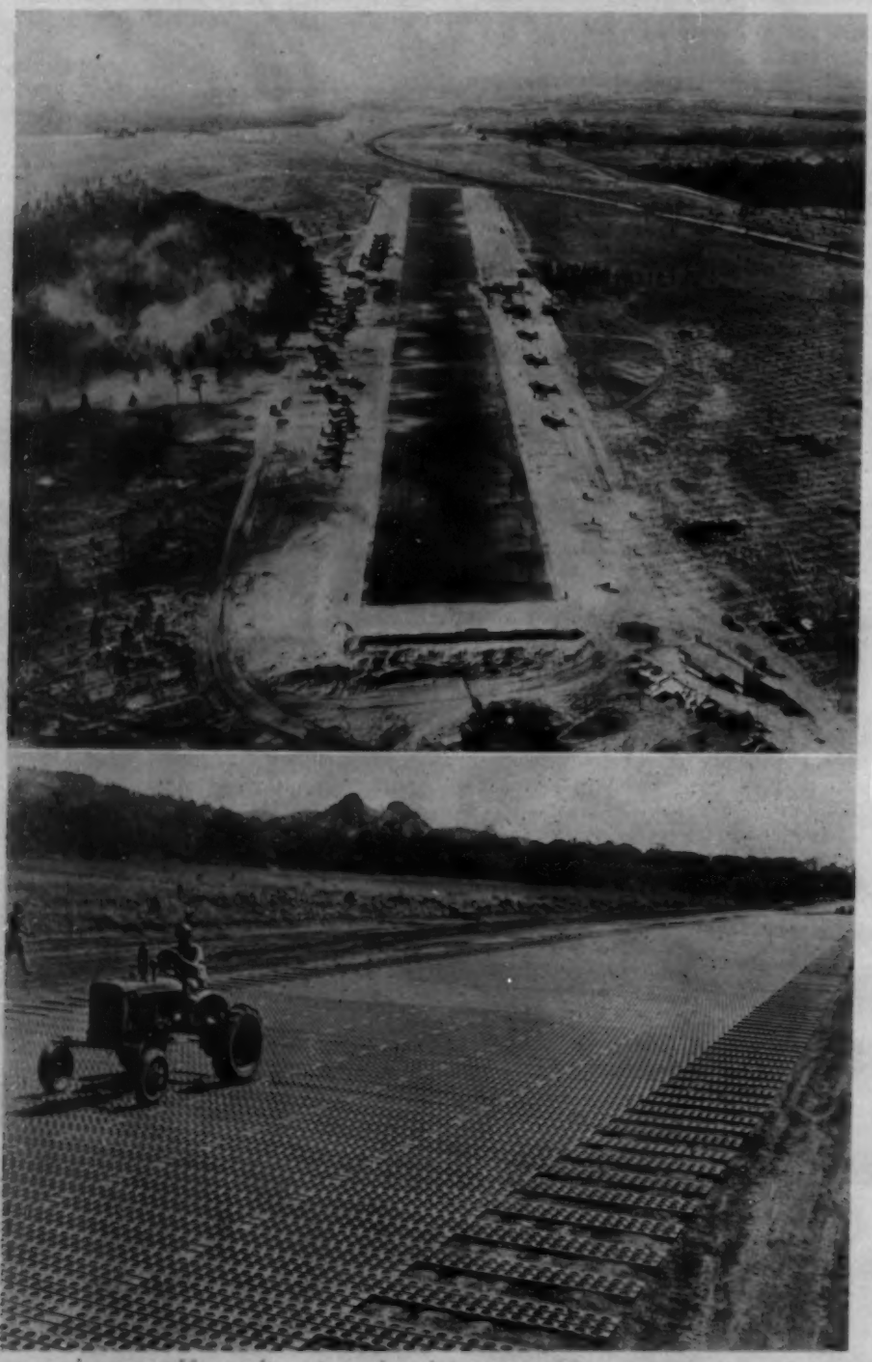
Wage Increases Outrun Living Costs in Automotive Plants

DETROIT

Workmen in automotive plants are now earning higher wages, both in terms of dollars and of actual purchasing power, than ever before in the history of the industry, according to data prepared by the Bureau of Labor Statistics. Overtime work and high wage rates for skilled workmen have advanced the average weekly income to $50.29. This compares with $40.61 a year ago and with $30.87 three years ago. In terms of real earnings, the advance amounts to 40 per cent over 1939, despite rising living costs.

The bureau's statistics are conservative, as new war plants being operated by automotive companies are not included in the study. Including the latter plants, average weekly wage in the industry, for April, was $54.37, while in May the figure rose to $54.89.

Since early in December, average weekly wages have increased $9.32 while the cost of living index has advanced only $6.55 a week.



Lieut. Gen. Arnold, chief of Army Air Forces, last week congratulated Carnegie-Illinois Steel Corp. for development and production of portable steel landing mats for use on air fields at remote posts. Perforated steel sections are 10 feet long, 15 inches wide. Accompanying photos show, above, runways in place at a U. S. outpost; below, an airfield under construction

McNutt To Stop Labor Pirating in Critical Areas

WASHINGTON

Manpower Commissioner McNutt last week demanded "labor pirating" be stopped, announcing a program for co-operation with management-labor groups for checking "pirating" between industries. The principal aim is to halt the practice in war industry areas. Where labor and management fail to agree on means, he will act to stop "raiding", he said. He will designate the areas of shortage as "critical labor areas" and will specify critical occupations, permitting such jobs to be filled only through methods approved by government.

Signs Final Amalgamated Pact; No Labor Trouble in 50 Years

GRANITE CITY, ILL.

G. Hayward Niedringhaus, president, Granite City Steel Co., and grandson of the company representative who negotiated the first agreement with the Amalgamated Association of Iron, Steel and Tin Workers, signed the final contract with the union on July 14. He then sent a letter to Ward Walcott, Pittsburgh, president of the Amalgamated, in which he termed the company's record with the union as "unique in the annals of labor relationships and collective bargaining."

"Our first agreement was signed in June, 1892, and since then annual conferences have been held and agreement reached without any dissensions or cessation of work," the letter stated. "This could not have been accomplished had there not always existed a wide and sympathetic mutual understanding of problems of both men and management. I

(*Please turn to page* 111)

Development of Sponge Iron Process Would Retard War Effort, Research Council's Committee Reports to WPB

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Government "would not be justified in putting money and energy into it," metallurgists declare, as Congress appropriates $600,000 for experiment . . . Explain why it would be "a wasteful diversion"

◆

SPONGE iron is an inferior substitute for steel scrap, the processes by which it could be produced are costly and inefficient, and the establishment of sponge iron plants would be wasteful in the overall production effort.

These are among the conclusions contained in a report to the War Production Board by the Advisory Committee on Metals and Minerals, National Research Council of the National Academy of Sciences.

Release of the committee's study followed considerable agitation for the building of sponge iron plants by congressmen and the initiation of a pilot plant program and investigation by the Bureau of Mines, Department of the Interior.

Senator Joseph C. O'Mahoney, Wyoming, who as chairman of the Temporary National Economic Committee, "investigated" the steel industry several years ago, proposed that sponge iron plants be built "at the mouth of every ore mine" (Steel, June 29, p. 44). He said he had been told that sponge iron could be produced for $5 a ton less than the cost of pig iron produced by the blast furnace method. Other congressmen, including Senator Harry S. Truman, Missouri, chairman of the war investigating committee, held ideas similar to those of early proponents of the plan.

Congress made available to the Bureau of Mines $600,000 under the head of "war prosecution" activities for the development of sponge iron processes. The bureau proposes to build two pilot plants to cost $500,000 (Steel, July 13, p. 60).

The Advisory Committee on Metals and Minerals points out that despite 100 years of effort, the last 30 of which have been extensive, the sponge iron process has gained no headway in this country and practically none throughout the world.

Contrasting the large capacity of modern blast furnaces with the limited output of sponge iron plants, the committee finds that the latter process would require more manpower, more strategic materials, fuel, refractories, fluxes and ferromanganese than present methods.

Even if high-grade iron ores—much prized in present steelmaking practice — were diverted to the sponge iron process, the resultant product still would contain 6 to 8 per cent of impurities, making the use of it in steelmaking furnaces "extraordinarily costly in rate of output" and in labor and strategic materials, the committee reported.

Committee's Summary

Summary of the committee's conclusions follows:

1—The sponge iron process is not new. Having been available basically since before the adoption of the blast furnace and the open hearth, and having been before the iron and steel industry in its present form for over 30 years, the fact that this small-scale method has not been adopted is evidence of its inferiority compared to present large-scale processes.

2—One primary reason for the inferiority of the sponge iron process is that it is not adapted to such large size units as are the present commercial processes. Also, the necessary automatic materials handling devices, so highly developed and efficient in the present process, are not developed and are not likely to be developed until after many years of operation. Hence, much more labor to do a given piece of work will be required for the sponge iron process.

3—The iron blast furnace and coke oven not only handle tremendous tonnages of ore, flux, and coke and use a remarkably small amount of labor, but they require practically no repairs over long periods. For example, a blast furnace will run five or more years without being shut down for repairs. The sponge iron furnace, however, has not been proved to have these advantages because it has never been operated for a long, continuous period. From experimental results, however, one is justified in assuming that furnace repairs will be very frequent and costly in materials, labor and supervision.

4—Sponge iron would represent a poor substitute for scrap as it is inferior in many respects, a few of which are:

(a) Sponge iron is finely divided and porous in nature and hence, is more readily oxidized in the open-hearth furnace. Briquetting to overcome the fineness of division creates an additional operation requiring more labor, materials and equipment. Even the briquetted or highly compressed product is still more readily oxidized than scrap, resulting in loss of iron in the slag and the need for more processing in the steel furnace. This would reduce furnace output and require more labor, more fuel and more ferromanganese or other strategic reducing agent.

(b) Sponge iron, even when made from the purest iron ores available and when reduced by hydrogen, contains more impurities, e.g., silica, alumina, sulphur and phosphorus, than steel scrap. This requires the use of additional labor, fuel, fluxes, refractories and ferroalloys and results in a lower output per furnace. Iron ores pure enough to warrant the use of sponge iron in the steel furnace are not available for this use. There is an insufficient supply of such ore for the present needs of our established steel industry. To take such ores away from the present uses would drastically interfere with production, now highly geared to a rate of production never before equalled. And even if this were done, the above disadvantages would exist although to a lesser degree.

(c) The less pure ores that might be available for the sponge iron process would produce a product high in slag-making constituents requiring excessive use of fluxes, refractories, fuel, labor and ferroalloys which would make its use decidedly unwise in present steel melting operations. To build additional melting facilities for this marginal product would be more uneconomic than to build new conventional blast furnace and open-hearth or bessemer plants for reasons stated above.

(d) Unfortunately, the require-

ments for large amounts of cheap gas and pure ores cannot be met in any one locality. To make use of the large amount of natural gas available in Texas, only the very impure Texas ores could be used. To convert the product into steel or a steel scrap, melting equipment would have to be built. The total materials of construction, time for putting into operation and labor required for such a development would doubtless be greater than for the conventional process. This is especially true if viewed in the light that the sponge iron process is still experimental and many months of trial operation would be required before a commercial size plant could be safely designed and built.

e. If coal instead of gas is used as a reducing agent, still more slag-making impurities such as silica, alumina and sulphur are introduced, making the sponge iron less suited than ever for conversion to steel. Moreover, coking coals are so plentiful and well distributed in the United States that the advantage claimed for the sponge iron process, that it can use noncoking coals, does not hold. Even in Texas the blast furnace being built in Houston to supply pig iron to the steel plant there from Texas iron ores will use coke made from nearby Oklahoma coking coals.

f. These observations are true for electric melting furnaces as well as for fuel fired open hearths. The electric furnace is better adapted to melting sponge iron than the open hearth because its atmosphere is not so oxidizing. Being a more expensive melting unit and requiring electrical equipment and other strategic parts as well as electric energy, such a use should not be considered at this time.

Pig Iron Is Best

5—Whereas sponge iron, as outlined in 4 above is less satisfactory than steel scrap as a melting stock for steel production, scrap is less satisfactory than pig iron. Numerous facts attest to this.

a. The steel industry pays more for pig iron than scrap.

b. The use of pig iron speeds up the steelmaking process; it may be added in molten form to the open hearth; it may be converted rapidly to steel in the bessemer; it makes possible the use of iron ore in the open hearth, thus providing steel direct from ore by a simple means less expensive than by way of sponge iron.

c. It is cheaper to handle pig iron, whether solid or molten, than scrap.

d. The claim often made that sponge iron, being low in carbon content, is purer and better than pig iron, is contrary to the facts. The slag-making impurities in sponge iron are costly to handle and the low-carbon content is no asset. The silicon and carbon contained in pig iron enter into the steelmaking reaction and make possible the use of large amounts of iron ore in the charge. For example, by using 50,000,000 tons of pig iron in the open-hearth charge, about 4,000,000 tons of additional iron may be obtained from direct reduction of iron ore in the charge. This in itself represents an important method for direct reduction of iron ore, far more efficient and practical than the sponge iron method.

Full Use of Materials

6—From the viewpoint of efficient use of raw materials also, pig iron is superior to sponge iron. The by-product coke oven and the blast furnace both make use of all the raw materials going into them. They produce much needed by-products. In addition to the coke oven by-products so essential in our war time chemical industry, the by-product gas is used in the steel plant for melting and heating steel for rolling. The "waste" gas from the blast furnace is utilized in making power, melting steel, etc. The integrated steel plant needs more gas than it makes as by-product and hence wastes none of it. Even the blast furnace slag is put to good use for making cement, building roads or as aggregate for building construction.

7—Because no accurate detailed estimates of the cost of commercial sponge iron plants have been made, one is not justified in comparing plant costs of the sponge iron process with the conventional blast furnace process. However, the blast furnace has the theoretical advantage of lower cost and lower overall requirement of construction material because of its larger scale of operation.

8—Re-examination of the sponge iron process from these angles shows definitely that the process, which has never been operated satisfactorily on a large scale in this country, presents no advantages that would warrant its development at this time. The government would not be justified in putting money and energy into its development as a war measure. Devotion of time of the nation's production personnel to further attempts to commercialize this process would be wasteful. During the emergency those energies should be devoted to getting the most production of steel products possible by present established methods.

9—The steelmaking process as practical in this country is so highly mechanized and efficient and carried on in such large units that the adoption of the small-unit sponge iron process, not possessing mechanical handling equipment and not readily adapted to use it, would be a step backward in our efficient utilization of labor and materials.

10—The undertaking of a program to produce sponge iron to supplement the supply of iron and steel scrap is inadvisable because even though sponge iron would serve as a poor substitute for scrap, it would do so at the expense of labor, furnace capacity, fuel and other essential raw materials. The net result would be a loss rather than a gain in overall production.

11—If, as a result of a scrap shortage, open-hearth furnaces became idle, then the steel plants would use sponge iron, if it were available, in spite of its disadvantages. If the establishment of the sponge iron process requires diversion of materials of construction from essential uses such as ships, blast furnaces, aluminum plants, etc., then the value of the availability of sponge iron would be counteracted by loss of production in other places. Hence, it is necessary to weigh the need for sponge iron producing capacity against its cost in other strategic products. Actually it becomes a question as to whether a scrap shortage should be averted by construction of sponge iron capacity or more blast furnaces.

Still Experimental

12—The sponge iron process is not established on a commercial size scale, and experimental demonstrations have not proved that large operations can be established with certainty in any given time. The production of sponge iron is still experimental and furthermore much test work (costly in terms of steel production) would be needed before sponge iron could be used regularly for steel production.

13—The blast furnace production of pig iron is a long established operation, efficient in use of labor, raw materials and by-products. Its product, pig iron, is the most satisfactory form of iron from which to make steel. Hence, additional iron to supply the nation's steel requirements can best be made by the production of pig iron in the conventional blast furnace.

14—There are so many unfavorable aspects to the sponge iron process that its development would appear to be a retardation of the overall war effort. Diversion of our iron ores, diversion of electric furnace capacity or of materials of construction, diversion of raw materials, labor and energies would be a high price to pay for the development of a substantial production of sponge iron whose utility is so questionable. The establishment of sponge iron plants would be wasteful in overall productive effort.

15—The undertaking of a large research and development program

for the production of sponge iron as a substitute for scrap is inadvisable at this time. Research and development are justified, however, for the development of a suitable process for making powdered iron for use in the new "powder metallurgy." Since the requirements for powdered iron are measured in thousands of pounds and the current price 10 to 12 cents a pound, processes similar to the sponge iron process should apply. Such a program of investigation is now under development for the War Production Board.

Recommend Sponge Iron Plant for St. Louis

Immediate construction of a sponge iron plant in the St. Louis area to cost $4,000,000 has been recommended to the WPB by four men who recently investigated a similar plant at Muskogee, Okla.

Those signing the recommendation were H. A. Buehler, Rolla, Mo.; state geologist; Frank J. McDevitt, production contract manager for WPB in St. Louis; Lieut. Col. E. H. Sager, chief of the manufacturing service, St. Louis Ordnance District; and John R. Keyes, WPB manager, Tulsa, Okla.

Purchase of the Muskogee plant, which has a capacity of 2½ tons daily, for $25,000 and allocation of $6000 for moving and re-erection in St. Louis, also was urged in the report.

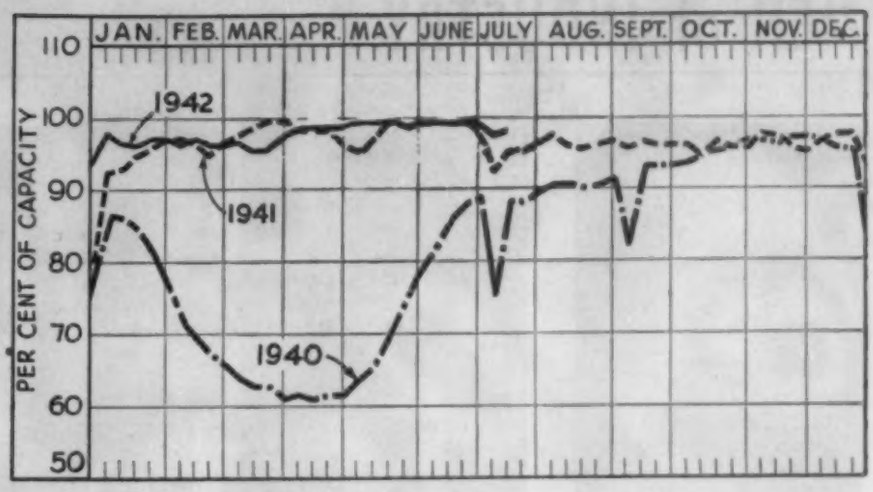
Plans To Make Sponge from Low-Grade Oregon Ores

Electro Thermic Reduction Co., Y. R. Cornelius, general manager, Cascade Locks, Oreg., reports it will have the first unit of a sponge iron plant in operation within a month. Low-grade ore from the Scappoose and St. Helens, Oreg., areas and iron sand from the Columbia river will be used, it is stated. The first unit will be of 5 tons capacity and it is "planned to expand to 250 tons per day" when feasibility is proven. The plant is four miles from Bonneville dam, which will furnish power.

Shape, Piling Output At War-Time Peak

Increased production of structural shapes and steel sheet piling to keep pace with expanded plate output was announced last week by Reese H. Taylor, chief, Iron and Steel Branch, WPB.

Specific directives issued by the branch resulted in shipments of 481,182 tons of shapes in June. The previous high mark since the beginning of the war was 451,000 tons in November. Production for the past several months has ranged from 425,000 to 435,000 tons.



PRODUCTION . . . . Up

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week rose ½-point to 98 per cent. Four districts advanced, five declined and three were unchanged. A year ago the rate was 95 per cent; two years ago it was 88 per cent, both based on capacities as of those dates.

St. Louis—Steelmaking continued at 95½ per cent last week. This rate is expected for some time.

Buffalo—Advanced 2½ points to 93 per cent as Republic Steel Corp. relighted its only idle furnace after repairs.

Chicago—Addition of two open hearths which had been idle for lack of scrap raised the rate ½-point to 102 per cent, arresting the downward trend of the past six weeks. No furnaces are idle except for repairs.

Cincinnati—Removal of three open hearths for repairs caused the rate to drop 3½ points to 88½ per cent.

Birmingham, Ala.—Unchanged at 95 per cent, 23 open hearths being in operation.

Cleveland—Withdrawal of two open hearths by one interest and addition of one by another producer caused a loss of ½-point to 94½ per cent.

New England—Furnace repairs caused a decline of 2 points to 90 per cent.

Detroit—Repairs to four open hearths kept them idle most of last week, lowering the production rate 4 points to 85 per cent.

Pittsburgh—Production declined 1 point to 94 per cent because of furnace shifts resulting from need for repairs.

Wheeling—Regained the 6 points lost the previous week, to 83½ per cent, as scrap supply improved.

Central eastern seaboard—Maintained output at 96 per cent for the seventh week. Long idle blast furnace stack has been relighted on basic iron.

Youngstown, O.—Steel production rose 1 point to 96 per cent last week, with 76 open hearths and three bessemers in service. Republic Steel Corp. had all eight units in production at its Warren, O., plant, the first full operation in this district in several months. The same rate is scheduled for this week.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended July 18	Change	Same week 1941	Same week 1940
Pittsburgh	94	− 1	99.5	81
Chicago	102	+ 0.5	100	95
Eastern Pa.	96	None	97	86
Youngstown	96	+ 1	98	84
Wheeling	83.5	+ 6	91	94
Cleveland	94.5	− 0.5	95	63
Buffalo	93	+ 2.5	93	90.5
Birmingham	95	None	90	88
New England	90	− 2	95	75
Cincinnati	88.5	− 3.5	85.5	84
St. Louis	95.5	None	98	65
Detroit	85	− 4	86	95
Average	98	+ 0.5	*95	*88

*Computed on basis of steelmaking capacity as of those dates.

Reports New Record

"Continuing the march of record-shattering performances by Chicago district plants of Carnegie-Illinois Steel Corp., the United States Steel subsidiary's South Chicago Works established a new blast furnace production record for the first seven days of July with a total output of 76,129 net tons," company reports. "This exceeded the previous best performance over a 7-day period by almost 500 tons."

MEN of INDUSTRY

Clifford O. Richards

R. Nevin Watt

Walker H. Evans

Joseph G. Broz

CLIFFORD O. RICHARDS, heretofore assistant purchasing agent, Taylor-Wharton Iron & Steel Co., High Bridge, N. J., has been promoted to purchasing agent, succeeding **R. C. Schaeffer,** resigned. Prior to joining the company in January, 1941, he was associated with Fitz Chemical Co., subsidiary of J. T. Baker Chemical Co. Mr. Richards' office will be at the Easton, Pa., plant.

♦

C. W. Meyers has been named special representative in the aviation field with the manufacturer's products division, sales department, American Steel & Wire Co., Cleveland. Since 1937 he has been assistant manager, metallurgical department.

♦

E. J. Bausch, formerly representative in the Chicago district for Follansbee Steel Corp., Pittsburgh, has become associated with Lapham-Hickey Co., Chicago. The latter company has been appointed sales representative in that area for Follansbee.

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Douglas B. Rader, designer and advertising consultant, has been named director of advertising, Lindberg Engineering Co., Chicago. He replaces **R. C. Onan,** who was recently made Lindberg's district sales manager in Milwaukee. **Robert S. Aitchison** has been named sales promotion manager.

♦

J. A. Comstock has assumed responsibility for all material control functions and will have charge of the physical and chemical laboratories now established as a part of the inspection department, Pratt & Whitney Aircraft Division of United Aircraft Corp., East Hartford, Conn.

A. W. F. Green continues as materials engineer with responsibility for material development functions and will devote his entire time to engineering phases of material and process activities.

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R. Nevin Watt has been appointed general sales manager, Baldwin Locomotive Works, Philadelphia. He will have general supervision over all sales of the Locomotive and Ordnance Division and Standard Steel Works Division, reporting to **William H. Harman,** vice president in charge of sales.

Stewart McNaughton will continue as sales manager for steam locomotives; **Clyde G. Pinney** as foreign sales manager; and **Gunther H. Froebel** as sales manager, ordnance and general products.

Walker H. Evans has been named sales manager, Standard Steel Works Division, succeeding Mr. Watt, while **Joseph G. Broz,** formerly sales manager for Baldwin De LaVergne Sales Corp., has become sales manager, Diesel Division.

♦

Jack Singleton, member, American Society of Civil Engineers, and the past 15 years district engineer at Topeka, Kans., for the American Institute of Steel Construction, has been granted a leave of absence for the duration. He has been commissioned a major in the Corps of Engineers.

♦

Ira J. Snader, division manager of Republic Aircraft Products Division, Aviation Corp., has been made vice president of manufacturing of the corporation. He will be succeeded at Republic by **Sterling B. Withington,** formerly general manager, Brunswick-Balke-Collender Co., Muskegon, Mich. Mr. Snader joined Aviation Corp. in December, 1940, and eight years before that was in charge of standard machine tool design and production, Ex-Cell-O Corp., Detroit. He is vice president and a director, American Propeller Corp., subsidiary of Aviation Corp., and he will continue to have his office in Detroit.

♦

Lincoln Johnson, vice president in charge of the foreign department, Manufacturers Trust Co., New York, is now serving as an advisor to the Metals Reserve Co., Washington.

♦

Raymond C. Cosgrove, vice president and general manager, Manufacturing Division, Crosley Corp., Cincinnati, has been re-elected a director, Radio Manufacturer's Association for a term of three years.

♦

William W. Miller has joined the executive staff of Stewart-Warner Corp., Chicago, as head of its legal department. He formerly was associated with the firm of Tenney, Sherman, Rogers & Guthrie, Chicago.

♦

P. D. May has been appointed South Carolina farm products agent for Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., succeeding **D. D. Whitcomb,** who has been promoted to farm products marketing agent at Birmingham. Mr. May's headquarters will be in Leesville, S. C.

♦

James C. Tweedell, since 1935 manager, export division, York Ice Machinery Corp., York, Pa., has assumed duties of general sales manager for the duration. He succeeds **John R. Hertzler,** who has undertaken a special assignment in a ci-

vilian capacity with the Army-Navy Joint Munitions Board, Washington.

♦

S. P. Kinney, formerly vice president, H. A. Brassert & Co., has formed his own company, known as S. P. Kinney Engineers, to handle the manufacture, sale and installation of all accessory equipment previously made and distributed by the Brassert organization. (STEEL, July 6, p. 71). Headquarters are at 233 Oliver avenue, Pittsburgh.

♦

Joseph A. Elwood, until recently factory manager, Hydraulic Division, Sundstrand Machine Tool Co., Rockford, Ill., has been appointed general works manager, George Gorton Machine Co., Racine, Wis. Well known in machine tool circles, Mr. Elwood was for 19 years associated with C. W. Nash of

Joseph A. Elwood

Nash Motors, and was division superintendent in charge of tools and production of the Racine division from its inception. Later he was associated with the Ajax plant of Walker Mfg. Co.

♦

S. H. Mortensen, engineer in charge of A-C design for ten years, has been named chief electrical engineer of the Allis-Chalmers Mfg. Co. plants at West Allis, Wis., Cincinnati, Boston and Pittsburgh. He joined the company in 1905.

♦

Ernest S. Jefferies has been elected president, Universal Boring Machine Co., Hudson, Mass. **Charles A. Clarke** has been elected vice president and chairman of the board; **Joseph Wiggin,** vice president, and **Alson H. Goodsell,** treasurer.

♦

Philip W. Frieder, Philip W. Frieder Co., Cleveland, has resigned as vice president, Institute of Scrap Iron and Steel Inc., Washington. His resignation follows his acceptance of

S. P. Kinney

the post of technical consultant on scrap to the Metals Reserve Co. **Everett B. Michaels,** Hyman-Michaels Co., Chicago, treasurer of the institute, has been elected vice president succeeding Mr. Frieder, while **Hiram Winternitz,** president, Charles Dreifus Co., Philadelphia, has become treasurer, replacing Mr. Michaels.

♦

Dr. V. E. Wellman has been named manager of the newly created chemical and pigments department of the purchasing division, B. F. Goodrich Co., Akron, O. Dr. Wellman formerly was special technical assistant to **T. G. Graham,** vice president in charge of manufacturing.

♦

George J. Cossmann, associated with Graybar Electric Co., New York, over 42 years, has become assistant district manager of the company's central district, with headquarters in Chicago.

T. H. Beecher has become manager of Graybar's Indianapolis office, succeeding **A. J. Callaway,** who has been appointed a major in the Air Force.

E. S. Jefferies

DIED:

Arthur K. Reading, 59, assistant chief, Forgings and Castings Unit, Iron and Steel Branch, War Production Board, Washington, July 8, in that city. A graduate of Purdue University in 1905 with a bachelor of science degree in mechanical engineering, he joined the Office of Production Management, predecessor of WPB, in October, 1941. Prior to that he was associated with Zimmerman Steel Co., Bettendorf, Iowa, as general manager, and mechanical engineer, Bettendorf Co.

♦

S. Houghton Cox, 62, vice president and a director, Cleveland Twist Drill Co., in Pasadena, Calif., July 12. After he was graduated from Williams College in 1904, Mr. Cox joined Cleveland Twist Drill, founded by his father. Mr. Cox's brother, Jacob D. Cox III, is president of the company.

♦

A. J. C. Robertson, 65, head of the naval architect department, Fairbanks, Morse & Co., Beloit, Wis., July 10, in that city.

♦

Harry T. Colling, 52, president, H. T. Colling Co., Cincinnati, in that city recently. He was head of the Cincinnati Die and Toolmakers Association.

♦

Edward N. McKinney, 85, associated with James McKinney & Son, Albany, N. Y., fabricators of structural steel and iron work, July 12, in that city.

♦

Emmett K. Conneely, 58, manager of railroad sales, Republic Steel Corp., Cleveland, in Pittsburgh, July 10. Prior to joining Republic in 1933 he was vice president, Standard Steel Car Co., Pittsburgh.

♦

J. G. McMillan, 47, secretary, J. N. Landay Co., Pittsburgh, July 11. He also was secretary, Pittsburgh chapter, Institute of Scrap Iron and Steel Inc.

♦

John R. Bucher, 55, sales manager of the Canton, O., division of Hill Acme Co., Cleveland, July 8, in Canton. Mr. Bucher was formerly associated with the Canton Foundry & Machine Co.

♦

Earl C. Moss, 71, district manager of the Chicago office, Morse Chain Co. division, Borg-Warner Corp., from 1905 to 1938, and thereafter consulting engineer, at his home in Kenilworth, Ill., July 8.

Plate Allocation Plan Should Be Applied to Other Products, Says Buyer

By W. S. HARMS

THE PRIORITIES situation as it relates to all steel products except plates appears to be getting worse every day. Any buyer will agree that since the plate allocation plan was established, with its monthly filing of the PD-298 application form and the PD-299 consumption form, he knows "where he is at"—on steel plates.

He prepares a list of his minimum requirements monthly, and assuming he is doing important defense work he generally obtains what he needs. In any case, the War Production Board approves or disapproves his application.

Consumers, however, are discovering that bars, billets and structural shapes are not coming through—even though on order with an A-1-a rating for a long time.

Plates were supposed to be one of our most critical items, and for that reason the PD-298 application form was introduced. The result has been that each user has obtained plates for war work; inventories have been used to the fullest extent; production has been flowing smoothly on a monthly schedule, and our national capacity has been equitably distributed.

When it was first introduced four months ago, buyers complained against the paper work the plate allocation program caused them and their stores departments. Now we realize it has forced us into good procurement and stores practices, and has enabled WPB to do a good job of caring for our requirements on a month-to-month basis.

Before the plan was put in effect it was almost impossible to obtain plates except with an A-1-a. Today they are approved for rolling on the basis of end-use, as shown on PD-298.

If a production run were to require plates and bars for an important Army job with an A-1-a rating the following sequence probably would be noted:

Order No. 100P for 40 tons of plates entered June 24.
Required Aug. 30.
Plate requirement form PD-298 for August showing the above order filed on June 30, with the producer and WPB.
July 25 buyer is advised P.O. 100P is approved for August rolling.
Shipment made Aug. 30.

Order No. 101B for 20 tons of flat bars entered June 24, 1942. (Same time as plate order).
Required Aug. 30.
About July 25 the user asks the steel producer for a promise.

When a reply is received it probably is to the effect that in view of the fact the mills are operating 95 per cent on allocations the producer can make no promise, even on an A-1-a item, and suggests the user get an allocation.

If the item is an odd size it may be included in some rolling and possibly show up the day after much time and money have been spent in securing part of it from warehouse.

In summary, the buyer does not know what may happen and in self-defense the production department makes up schedules on the basis of inflated requirements, ordering way beyond actual immediate needs.

It is appreciated that the M-21-C plate order with the PD-298 and PD-299 forms has caused a great deal of work. But it has in the long run saved time—and, more important, has saved steel. The officials and the clerks in WPB who have made it work deserve praise. Since this system has worked so well with steel plates, let us give serious consideration to using it for other basic products, such as billets, shapes and bars.

THE AUTHOR has had extensive experience with government priority regulations—first for a large steel corporation in a mid-western manufacturing district, and more recently as a buyer for an equipment manufacturer. He has studied the rules from producers' and consumers' viewpoints. Last week there were indications the government is preparing to put in effect the changes he has advocated and which are explained in this article, written for STEEL.—THE EDITORS.

According to producers the chief difficulty today is not the rolling space but the steel supply. This situation would help clarify the application of the PD-298 system to the other commodities, since it would in effect be not so much an application for rolling space as it would be an application for the ingots necessary to roll the item.

Carbon steel billets could easily be handled on the present plate form, or one similar to it. If on July 30 all consumers were ordered to submit to producers—a copy going to WPB—a list of all billets needed by Sept. 30, the steel producers could file with WPB by Aug. 15 the total available for billets and other commodities. On the basis of the end-use shown, WPB could then allocate or approve the most important orders, to the limit of available capacity.

The first result of a general application of the plate order would be that consumers would find they did not need nearly as much tonnage of billets, bars and other commodities as they thought they did. It would relieve pressure on producers. It would let the user know where he stood within six to eight weeks after placing his order, and it would give him delivery within ten to 13 weeks.

The resulting benefits to the war production program and to the economic condition of the industry when the war is over would be incalculable.

It may be objected that rolling cycles of many structural shapes and bar sizes stretch over much more than a month's period. This is true whichever system is used to schedule the mill, but arrangements could be made to approve the necessary steel for rolling, the actual rolling to take place in the normal sequence, even if eight weeks later. And it would not be necessary to make the ingots or billets and lay them aside to await rolling, since an arrangement could be made to give the steel producer a certain amount of free tonnage each month for contingencies. The approved steel would go into this contingency reserve in the month that it is approved, and it would be taken from it in the month of the first rolling of the product ordered.

If this, or similar system were instituted it also would call for a consumption and inventory report on the commodity involved, similar to the PD-299 form on plates. The effect of this report should be noted for it has forced a revamping of inventory and stock applications in many plants, to their benefit as well as to the benefit of the critical material situation.

The new Allocation Classification system as outlined in Priorities Regulation No. 10 seems to be "a good idea with no place to go." Surely one does not expect the steel producer to take the responsibility of rolling a USA 4.30 (Priority A-1-a) before a USN 7.30 (Priority A-1-a) if he has not enough capacity to roll both. And to roll the order of the oldest date is just dodging the issue.

However, if we would establish a monthly application form for each important steel commodity showing a new end-use code, the proper WPB branch could immediately decide which was the most important for the month in question. A month later the item left off would be resubmitted and again reviewed by the authorities who should know which comes first.

If we want to go all out let us

go all out with the one priorities regulation which has been an unqualified success. To win this war we must not only get tremendous production, we must get the right material at the right time. Events are coming so fast that it would be well if we all took stock of ourselves and our requirements every 30 days.

My experience working with the PD-298 in a large steel producer's organization—and now on the other side buying steel for a large consumer—convinces me that we can apply the plate allocation system as outlined. In fact, if we do not adopt such a plan or one similar to it, we are in for more difficulties. Perhaps a better system can be worked out, but the Production Requirements Plan is very cumbersome, and the PD-298 set-up is well organized and needs only to be extended with minor changes in the necessary forms and organizational procedures.

Quota System for Each Product And Each Producer Announced

WASHINGTON

In a far-reaching move designed to channel steel output more directly into vital products, Reese H. Taylor, chief, Iron and Steel Branch, WPB, last Thursday announced a quota system for each of the various steel products and for each producer who makes them.

Purpose is "to balance steel production among the various products needed for war." Thus recent emphasis on semifinished steel for shipment abroad, plates, shapes, alloys, rails and rail accessories, and tin plate have resulted in diversion of steel from bars, sheet, pipe, wire and similar products.

By establishing quotas for each product and for each producer, the maximum necessary output of each product will be possible.

It has been the policy in recent months, Mr. Taylor said, to obtain the greatest possible tonnage of steel plates without regard to the effect of this diversion of steel on other products.

The new policy does not mean a decline in plate production necessarily. That will depend upon the relative need for other products and upon the overall supply of steel ingots. Companies which produce only plates will be expected to continue to produce the highest tonnage possible. Those with a diversified line will be expected to fill their quotas of other products before they turn out any over-quota plates.

With the total supply of steel ingots necessarily limited, the quota plan is expected to effect the best possible use of available raw material.

PRIORITIES—ALLOCATIONS—PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide as published in Section II of STEEL, July 6, 1942.

M ORDERS

M-9-c (Amendment): **Copper,** effective July 10. Permits use of copper in manufacture of binoculars and valves for ship use after Aug. 1.

M-81 (Amendment): **Tin Plate and Terne Plate Cans,** effective July 9. Authorizes use of cans on hand or in process on July 1 for certain products, including chemicals and paints, previously omitted from permitted categories of M-81.

M-112 (Amended): **Antimony,** effective July 11. Removes restrictions on deliveries of up to 50 tons per month of ores or concentrates by domestic mines. Permits delivery of 25 lbs. or less of contained antimony to any one person in one month, without an allocation. Limits antimony use in ceramic coatings to acid-resistant applications. Permits non-ceramic coatings to use up to 2% antimony.

M-126 (Amended): **Iron and Steel Conservation,** effective July 13. Extends production ban to additional list of civilian articles. Adds new list of products which may be made without restriction for Army, Navy and Maritime Commission. Appeals from order restrictions are to be filed on PD-500 at WPB field offices. Until this form is available PD-437 should be used.

M-150 (Amendment): **Aromatic Petroleum Solvents,** effective July 11. Extends order restrictions to cover all grades of xylol derived from coal tar and all other sources.

L ORDERS

L-28 (Amendment): **Incandescent and Fluorescent Lamps,** effective July 10. Specifies that restrictions on weight of lamp bases apply only to weight of metals in such bases. Includes Panama Canal among agencies given 90-day exemption from restrictions of the order.

L-29 (Amendment): **Metal Signs,** effective July 15. Changes provisions under which sign manufacturers may dispose of frozen inventories of iron and steel to conform to Priorities Regulation No. 13.

L-33 (Amendment): **Portable Lamps and Shades,** effective July 13. Permits manufacturers to use existing supplies of parts previously prohibited, provided parts at least partially fabricated and in inventory of manufacturer or supplier prior to March 23, 1942.

L-39 (Amended): **Fire Protective Equipment,** effective July 11. Prohibits manufacture of stirrup pumps or parts except for Army, Navy, Maritime Commission, War Shipping Administration, Defense Supplies Corp. or Lend-Lease. Permits assembly of parts containing no nonferous metals and at least partially fabricated by July 11. Prohibits use of copper or its alloys in all extinguisher pumps except tetrachloride extinguishers.

L-59 (Amendment): **Metal Plastering Bases,** effective July 11. Restricts manufacturing during four months beginning July 1 by those companies using more than 14,000 tons of metals during 1941 to 10% of average iron and steel use and to 25% of average zinc use in 1940-41. Small companies restricted to 50% for iron and steel and 35% for zinc.

L-62 (Amendment): **Metal Household Furniture,** effective July 11. Permits assembly until Sept. 1 of die castings for Venetian blinds, provided they were fabricated and in stock March 20, contain not over 2% aluminum and cannot be used for any other purpose.

L-89: Elevators, effective July 9. Requires WPB authorization for manufacturers to fill orders for elevators equipped with other than single speed AC or DC rheostatic control, or equipped with other than manually operated doors or gates; also orders for revised control or other parts and accessories. Authorization applied for by purchaser on PD-411. PD-562 filed by manufacturers with application for permission to continue production on restricted orders already in process.

L-113: Industrial Power Trucks, effective July 10. Prohibits manufacturers from accepting orders unless rated A-9 or higher on PD-1A or PD-3A certificate. Deliveries limited to orders placed before July 10 and rated A-1-k or higher or to orders placed after July 10 rated A-9 or higher on PD-1A or PD-3A. Production limited after July 10 to standard models, after Aug. 15 to "approved standard models" as subsequently defined by WPB. Limits use of specified critical materials.

L-121 (Amended): **Construction Lumber,** effective July 10. Extends order until Aug. 13.

L-147: Machine Tools, effective July 10. Prohibits production of tools calling for special electrical specifications after July 15.

P ORDERS

P-73 (Amended): **Nonferrous Smelters and Refiners,** effective July 14. Permits smelters and refiners of 13 nonferrous melters to continue to operate under this order during the third quarter rather than file applications under the Production Requirements Plan.

P-126 (Amendment): **Refrigeration, Air Conditioning Machinery,** issued July 9, retroactive to June 30. Extends ratings for emergency repairs to commercial equipment to Sept. 30.

PRICE SCHEDULES REGULATIONS

No. 70 (Amendment): **Scrap and Secondary Lead,** effective July 13. Permits scrap sellers to charge buyers for copper contained in terminals of submarine batteries. Provides that maximum prices for copper content of lead-covered copper cable be determined in accordance with Schedule No. 20 as amended.

No. 166 (Amendment): Zinc Oxides, effective July 9. Changes effective date of regulation from June 22 to May 11. Permits maximum price of 7 cents per lb. on zinc oxides containing 35% or more lead, between May 11 and June 22.

WINDOWS of WASHINGTON

By L. M. LAMM *Washington Editor, STEEL*

Nelson receives report on steel expansion program. Some projects canceled . . . Post-war planning started by British and American groups . . . Steel prohibited in more civilian articles

WASHINGTON

A COMPLETE survey-report of the steel expansion program now in progress was submitted last week to Donald M. Nelson, after having been approved by subordinate officials. Just how much of the report will be made public depends on Mr. Nelson's views.

The original 10,000,000-ton increase planned for steel ingots was increased to 11,000,000 tons before new projects were canceled recently. It is now recommended that the figure be cut to 9,700 000 tons. It is understood also that a pig iron expansion program is recommended in the report, proposing an increase of 10,045,000 tons in annual capacity.

June War Expenditures Increase 6.3 Per Cent

Average daily rate of war expenditures by the federal government in June rose to $158,600,000, according to WPB tabulations. This includes Treasury disbursements and amounts paid by the Reconstruction Finance Corp. and its subsidiaries.

June spending compares with an average daily rate of $149,200,000 in May, a 6.3 per cent increase. The rate of increase in June over May was lower than in preceding months. Percentage gain in May over April was 10.7 per cent; in April, 12 per cent; and in March, 20.9 per cent.

Half of the nation's factory output now is war materials, according to estimates by the Federal Reserve Board. Among durable goods production, the war share is 70 per cent, the board's figures show.

Hitler Orders Confiscation of All Unused Iron and Steel

Hitler has ordered confiscation of all unused iron and steel in Germany, including finished castings and spare parts, a Berlin domestic broadcast revealed last week.

The campaign will be enforced by the uniformed police under Heinrich Himmler, Gestapo chief. Factory managers who fail to comply with the new decree will be arrested.

Material to be collected, the broadcast said, "includes in particular old iron, unprocessed iron and steel material, of unusual kinds and measurements, half finished iron and steel material and castings from canceled orders, finished iron and steel products and finished castings which had been stocked by industry and the armed forces as spare parts, but which, owing to a change of types are no longer needed, and, finally, shut-down plants under special conditions.

"The general compliance with metal control will be ensured by the fact that each offense against the natural obligations of the manager falls under penal stipulations of the order of the Fuehrer of March 21.

"Further active support of the total action will be brought about by the uniformed police through a special decree of the Reich leader's S.S."

American, British Groups Planning for Reconstruction

British industrialists, through the Federation of British Industries, have laid down far-reaching plans for the post-war period and have asked their government to work out a system of consultations on world problems with the United States.

The federation's "report on reconstruction" concluded that:

"Policing the world against aggression" is basic to post-war economic organization and prosperity.

Some larger grouping of nations economically, regardless of political aspects, appears inevitable, and that this might entail "an alteration of our past conceptions of national sovereignty."

Starting point in the new setup is close co-operation between the United Kingdom and its dominion partners, including India, and the United States, and calls for intimate collaborations with Russia and China.

A primary economic problem will be the raising of world purchasing power.

Economic situation of the British Isles may be so changed by the war that the country may not adapt itself easily to free and unrestricted world trade, and may come into sharp conflict with ideas of the United States.

British policies after the war will depend to large extent on the way in which the United States decides to settle the lend-lease accounts.

Study of post-war problems also is underway in the United States by a staff working under the direction of Undersecretary of State Sumner Welles, and collaborating with some members of Congress.

The study will cover a broad field, including the economic, political and social trends to be taken into account when the peacemakers start to revamp a world disrupted by global war.

Congressmen interested in the study said it would be based on President Roosevelt's program of the four freedoms: Freedom from want, freedom from fear, freedom of speech and freedom of religion.

Steel Replaces Brass in Shell Cases; 30 Firms Hold Orders

Substitution of steel for brass in the manufacture of all artillery cartridge cases will take place in the next few months. Disclosure by Secretary of War Stimson of the changeover coincided with announcement last week by the War Department that over 30 manufacturers are now making the new steel cases. They were found by ordnance experts to be "as satisfactory as cases made from brass."

Similar experiments are reported just beginning in the field of small arms ammunition, with preliminary tests showing good results. The switch, adopted to conserve copper, was made after a year of experiments and development work of several industrial firms.

Mr. Stimson stated that another important development in ordnance manufacture is the conversion of steel components formerly produced by forging, casting and automatic screw machine processes to pressed steel.

Prohibit Use of Steel in Additional Civilian Articles

Manufacture of an additional long list of civilian articles has been prohibited by the WPB by an amendment to the iron and steel conservation order, M-126.

Garden tools, hospital equipment, merry-go-rounds, magic lanterns, umbrella shafts and vanity cases are typical of the many items specified in Supplementary List A added to the order. Manufacture of many of these articles already has been stopped by Order M-21, which limits deliveries of iron and steel to preference ratings of A-10 or higher.

A manufacturer of items on Supplementary List A is given 30 days to process iron or steel for these purposes, with a limit of 75 per cent of the average monthly weight of

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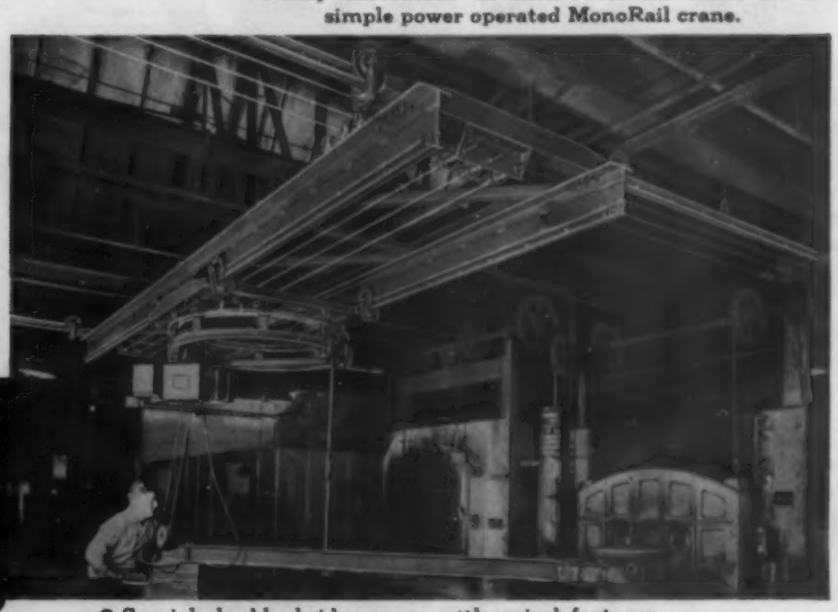

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all metals processed by him in 1941. Assembly of these articles is permitted for an additional 30 days.

A new list, C, is added for Army, Navy and Maritime Commission orders. Articles on List C for these governmental agencies may be manufactured without restriction. List A restrictions do not apply to Army-Navy-Maritime contracts until Aug. 4 and Supplementary List A restrictions until 60 days from issuance of order.

No other metal or rubber may be used to manufacture any article, production of which is stopped by M-126.

Appeals, as heretofore, must be filed with the WPB field office for the district in which the plant is located to which the appeal relates. A new form, PD-500, is provided for these appeals. Until PD-500 is available in field offices the current form, PD-437, may be used. Final handling of appeals, formerly located in New York, has been transferred to a new appeal branch in Washington.

War Plant Contractors May Obtain Steam, Power Equipment

Limitation Order L-117 has been amended to allow contractors engaged in the construction of industrial plants to obtain delivery of heavy power and steam equipment to be used in such plants by extending preference rating certificates on orders issued to the persons for whom such plants are being constructed. Heretofore, Order L-117 permitted heavy power and steam equipment to be delivered only to the person to whom a preference rating certificate or order was originally issued.

Antitrust Prosecutions Called "Modern Miracle of Propaganda"

National Association of Manufacturers, Washington, in a report on patent litigation started by the Department of Justice, charges Thurman Arnold, assistant attorney general, with engineering "one of the modern miracles of propaganda", to give Congress and public the impression that the patent system interfered with the war program. In reality, the government has long held the power to authorize production for its use at any time of any product, regardless of patents, NAM states.

Processes for production of rubber, aluminum, magnesium, optical instruments, chemicals or other strategic or critical material or product are "open to pre-emption by government."

The report further declared that Mr. Arnold's attack questioned property rights in patents which had been upheld through courts for over 100 years; and that cases of alleged abuse, now subject of antitrust suits, were cited by him as typical examples to justify changing the patent system as a war emergency measure.

Benjamin Schwartz To Head BEW Scrap Metals Section

Benjamin Schwartz has been appointed chief, Scrap Metals Section of the Board of Economic Warfare. Mr. Schwartz was formerly director general of the Institute of Scrap Iron and Steel, and vice president of Schiavone Bonomo Corp., New York and Jersey City, N. J.

The Scrap Metals Section of BEW will have the responsibility of organizing and developing new sources of supply of the scrap metals in the twenty-one republics of North and South America (exclusive of the United States), Africa, Australia and all other countries available to the United Nations, for importation to the United States.

Under an executive order of the President, the Board of Economic Warfare, of which Vice President Wallace is chairman, has been given the responsibility of development, procurement and stockpiling of certain strategic materials, including scrap iron and various nonferrous scrap metals, to be imported to this country.

More Industry Advisory Committees Appointed

Additional industry advisory committees in the metalworking field were appointed last week by T. Spencer Shore, chief of the WPB Division of Industry Advisory Committees. They are:

Industrial Refrigeration

J. M. Fernald, chief, Air Conditioning and Commercial Refrigeration Branch, government presiding officer.

Members are: W. H. Aubrey, Frick Co. Inc., Waynesboro, Pa.; F. H. Faust, General Electric Co., Bloomfield, N. J.; D. F. French, Carrier Corp., Syracuse, N. Y.; G. A. Heuser, Henry Vogt Machine Co., Louisville, Ky.; H. F. Hildreth, Westinghouse Electric & Mfg. Co., Springfield, Mass.; F. D. Kirk, The Vilter Mfg. Co., Milwaukee; C. E. Wilson, Worthington Pump & Machinery Corp., Harrison, N. J.; P. B. Zimmerman, Airtemp Division, Chrysler Corp., Dayton, O.; O. Z. Klopsch, Wolverine Tube Division, Calumet & Hecla Consolidated Copper Co., Detroit; Charles Knox, Baker Ice Machine Co. Inc., Omaha, Nebr.; Marshall G. Munce, York Ice Machinery Corp., York, Pa.; G. E. Wallace, The Creamery Package Mfg. Co., Chicago; K. A. Weatherwax, Acme Industries Inc., Jackson, Mich.

Forged Axe, Hatchet, Hammer

John L. Haynes, chief, Building Materials Branch, government presiding officer.

Members are: H. W. Conarro, Warren Axe & Tool Co., Warren, Pa.; J. B. Parsons, Mayhew Steel Products Inc., Shelburne Falls, Mass.; Charles F. Griffith, Griffith Tool Works, Philadelphia; L. B. Hough, Collins Co., Collinsville, Conn.; Mark J. Lacey, The Peck Stow & Wilcox Co., Southington, Conn.; E. S. Mulford, Henry Cheney Hammer Co., Little Falls, N. Y.; K. Clyde Council, The Council Tool Co., Wananish, N. C.; Fayette R. Plumb, Fayette R. Plumb Inc., Philadelphia; W. W. Rector, American Fork & Hoe Co., Cleveland; O. A. Rixford, Rixford Mfg. Co., E. Highgate, Vt.; Sanford S. Vaughan, Vaughan & Bushnell Mfg. Co., Chicago.

Directors for Smaller War Plants Corp. Appointed

Lou E. Holland, president, Double Rotary Lawn Sprinkler Corp., Kansas City, Mo., has been appointed chairman of the WPB's Smaller War Plants Corp. The corporation was established under terms of recent congressional legislation to aid small companies obtain war contracts, has $150,000,000 capital.

Four other directors were named to the board. They are: James T. Howington, Louisville, Ky. Vice president of the Girdler Corp., Louisville, Mr. Howington has been manager of the WPB field office at Louisville since September, 1941.

William S. Shipley, York, Pa., chairman of the board of York Ice Machinery Corp., and a leader in the "York Plan" of subcontracting and pooling plant facilities.

Albert M. Carter, Murphysboro, Ill., director and past president of the First National Bank of Murphysboro. He is president of a small company which mines kaolin, near Anna, Ill.

Samuel Abbot Smith, Boston, president of the Thomas Strahan Co. of Chelsea, Mass.

Col. Louis Johnson Appointed President of General Dyestuff

Col. Louis Johnson has been selected to serve as president of General Dyestuff Corp., New York, it was announced last week by Leo T. Crowley, alien property custodian. Control of General Dyestuff Corp. was seized by the custodian July 6.

Colonel Johnson, Assistant Secretary of War from 1937 to 1940, just returned to the United States from India, where he was on a mission as personal representative of President Roosevelt.

General Dyestuff, according to Mr. Crowley, is the sales agency of General Aniline & Film Corp., dye manufacturing firm which formerly was controlled by I. G. Farben, the German chemical trust, but which has been under government control, since March of this year. Management of General Dyestuff consequently is linked closely to the war effort, and Colonel Johnson's selection as president of the firm was dictated largely by his unique knowledge of Army requirements and of the international ramifications of the present conflict.

Special Electrical Specifications For Machine Tools Banned by WPB

WASHINGTON

TO ACCELERATE the manufacture of machine tools, WPB has prohibited production of tools calling for special electrical specifications.

Special electrical specifications include nonstandardized types of electrical controls, motors, and other equipment not normally used by machine toolmakers. They also include methods of attachment of such appliances which represent departures from the usual technical practices.

Issuance of Order L-147 is expected to expedite increased production of machine tools through simplifying manufacturing specifications. In the past, machine tool purchasers have made a practice of developing their own specifications, with the result that the toolmaker was forced to spend time and effort in analyzing the specifications and re-adapting his production processes for each new order.

Production of machines was frequently held up by inability of the toolmaker to procure immediately the special type of electrical equipment called for by different types of specifications. Or the opposite situation developed where the toolmaker was forced to accumulate excessive amounts of special equipment to be stored until the appearance of the customer's machine in the production line.

With certain exceptions, machine tool builders in the future will comply with machine tool electrical specifications recently established by the American Standards Association and known as American War Standard Machine Tool Electrical Standards-C74-1942. The standard was developed by the National Machine Tool Builders Association, which requested the American Standards Association to carry it through the ASA Emergency Procedure. Electrical equipment manufacturers, machine tool builders, and users of machine tools, together with representatives of ASA committees on the National Electrical Code, Rotating Electrical Machinery, Electrical Industrial Control Apparatus, etc., were brought together and agreement reached on the final standard.

The standard has been found to provide satisfactory electrification for most purposes, and only under special conditions will machine tool builders be authorized to produce tools which do not comply with these specifications.

Certain exceptions to the WPB regulations are listed in the order. These include orders placed by the Army, Navy or Maritime Commission for their own use and orders authorized by the WPB. Permission for the latter will be considered only if a letter setting forth the reasons why special electrical specifications are necessary is sent in triplicate addressed to the Tools Branch, Ref: L-147, War Production Board.

For orders received before July 15 calling for special electrical specifications, provision is made for delivery if the tool builder's engineering department had approved the specification before July 10. Likewise, delivery may be made if the special motor, control, wiring or other device has already been received by the builder or will be received within 30 days after issuance of the order.

If the machine is ready for delivery but is held up because of non-delivery of special equipment, the builder must request the purchaser to take the equipment normally applied by the builder to his machines. If the purchaser declines, the machine is to be shipped with standardized equipment to the next order scheduled under General Preference Order No. E-1-b for which the tool is suitable. Exception to the regulation is made only through permission of the WPB.

Navy Transport Launched at Long Beach

NAVY transport vessel, U. S. S. DOYEN, slides sidewise down the ways in recent launching at Consolidated Steel Corp.'s Long Beach, Calif., shipyard. NEA photo

Industrial Power Truck Manufacture Restricted

Strict control of production and distribution of industrial power trucks—the types designed primarily for handling material in and around factories, warehouses, docks, airports and depots—has been ordered by the WPB.

Effective immediately, manufacturers are prohibited from accepting order for an industrial power truck other than an order rated A-9 or higher on Preference Rating Certificate PD-1A or PD-3A. In addition, no manufacturer may deliver, and no person may accept delivery of, any industrial power truck except on an order placed before July 10 bearing a rating of A-1-k or higher, or on an order placed after that date rated A-9 or higher on PD-1A or PD-3A.

Brass, Bronze Foundries Under Allocation Classification July 31

WASHINGTON

EFFECT of the Allocation Classification System on brass and bronze foundries obtaining metal was explained last week by the WPB Copper Branch.

The system designating end-use of metals to facilitate allocation will operate after July 31 and must be complied with by foundries. They must report deliveries to customers during the previous month on Forms PD-123A and PD-123B, showing the final end-use of products in each shipment. On the basis of this report, and the application form PD-59 revised, foundries will be allocated new material to replace that shipped.

That foundries may know exactly how products were used and may report to WPB fully, they must obtain from each customer the appropriate allocation classification symbol and purchaser's symbol, to show the end-use of material delivered on that order. This information is to be included on the purchase order.

Some question exists among foundries as to whether end-use must be reported for orders placed some time ago. The Copper Branch says that any delivery made after June 30, 1942, must be reported on Forms PD-123A and PD-123B, even though the order was placed many months ago.

Although an order carries a low rating, it may be vital to the war program. Certain orders bearing preference ratings lower than A-1-k may be received and be reported to WPB for possible authorization. Following are end-uses for which the Copper Branch will seriously consider authorizing copper if the orders should bear a rating lower than A-1-k:

Railroads, streetcars, buses, public utilities, maintenance and repair of essential industrial equipment, mines, petroleum industry, waterworks, hospitals and health supplies, maintenance and repair of schools, textile industries engaged in production of material for Army or Navy use, defense housing (critical list) in specific areas designated by the Building and Material Branch as being essential for war purposes, fire-fighting equipment, essential repair for farm machinery, essential repair for elevators, essential repair for food preservation machinery and dairy equipment and essential parts for road-building equipment.

Increased Production of Domestic Chromium Sought by Bureau of Mines

MORE intensive studies of processes for domestic chromium production have been started by the Bureau of Mines. Congress has made available a $75,000 appropriation to finance the studies.

Two of these processes, according to Dr. R. R. Sayers, bureau director, appear destined to increase domestic output. These are (1) A beneficiation process for low-grade ores which has passed successfully all tests so far and has proved to merit large-scale pilot tests to determine best operating conditions for commercial use; (2) an electrolytic method for recovering high-grade chromium from domestic ores.

In seeking more effective means of recovering chromium from the extensive deposits of low-grade chromite ores, particularly in western states, the bureau is operating several pilot plants in its laboratories at Boulder City, Nev. Pilot plant tests show that the new beneficiation method—a roasting and leaching process—is capable of increasing the chrome content of low-grade ore and of raising the ratio of chromium to iron from about 1.7 to 1 to as much as 30 or 40 to 1. Research by the bureau indicates that it probably will be most economical to produce a residue having a ratio of 5 parts chromium to 1 part iron. When the iron content is lowered, production of standard ferrochromium from the ore thus is facilitated.

Definite recommendations for construction of commercial plants utilizing the bureau's roasting and leaching process will be made when final data are prepared upon completion of the tests.

A third process—known as the sponge chromium process—also was developed by bureau metallurgists and is used successfully on a commercial basis for making high-purity chromium from chromite ores.

The electrolytic method involves the treatment of an aqueous chromium sulfate solution prepared by extracting chromium from chromite minerals as soluble sodium chromate. Electric energy consumed in obtaining high-purity chromium metal from ores by this method is less than half that required by the usual electro-deposition process, bureau metallurgists report.

Additional Uses of Tin, Terne Plate Permitted by War Board

Tin and terne plate which had been put in process by May 16 and roofings, furnace pipe, and fittings in inventory on May 16 may be used for repairs, regardless of ratings, and on defense housing under an amended version of Suplementary Order M-21-e Amended order also adds certain items to the list which may use tin or terne plate, and relieves warehouses of the necessity for reporting to WPB on Army and Navy orders, but does require the warehouse to obtain a certification from its customer on these orders.

Schedule A of the original order, listing products which may use tin and terne plate, is extended by the addition of certain kinds of dairy ware, textile spools and bobbins, gasoline tanks, radiators for internal combustion engines, chaplets, skimgates, and tin forms for foundry use, torpedoes for oil and gas well shooting, and carbide nonexplosive emergency lights. Each of these new permitted uses is restricted as to type of plate, and amounts of tin and terne that may be used in each item.

Net effect of the amendment is to unfreeze certain inventories and to permit additional uses of tin and terne plate, not because the shortage of tin is any less critical, but because the items permitted fill a necessary place in both military and civilian economy.

Substitution of Antimony for Tin Encouraged; Control Eased

Control over antimony, important pigment base and lead and tin alloy, has been revised by an amended General Preference Order M-112. Supplies of antimony have become relatively more plentiful, and the order as amended will encourage the substitution of antimony for tin.

Chemical derivatives, with the exception of antimony oxide and sulphide, are removed from control of the order. Frit is included.

Amended order frees deliveries up to 50 tons per month of ores and concentrates by United States mines.

Deliveries of 25 pounds or less of contained antimony are permitted to any one person in one month, without an allocation.

Believes Diesels and Synthetic Oils Preclude Nazi Defeat for Lack of Fuel

PREDICTIONS of an early defeat of Germany which are based on supposed lack of fuel are likely to prove misleading, according to B. B. Williams, president, Cooper-Bessemer Corp., in a letter to the editor of STEEL. He states:

"There are two factors which make it much less likely that Hitler will be stopped by lack of engine fuel than is popularly believed. The first is the development in Germany of synthetic oil and substitutes, which are vital in that country because of limited oil supplies but which, of course, are not considered in any discussions of engine fuels in the United States because of our great reserves. The second is the remarkable development of the diesel engine in that country.

"On my last visit to Germany, I had the opportunity, because of my connection with the Cooper-Bessemer Corp., to investigate the production of diesel engines and the manufacture of fuels. Thousands of diesel engines were being constructed in Germany even then—for installation in tanks, trucks, tractors, trains and airplanes. In Germany, the diesel aircraft engine, as you perhaps know, is a reality, and thousands of Hitler's planes are thus powered. This application of the diesel engine principle to the German war machine has resulted in a tremendous saving of fuel—and has upset the calculations of many 'experts.'

"As you know, the work done by a diesel engine per gallon of fuel, whether it is to propel an airplane, pull a train, or dig a ditch, is about one and one-half to two times as much as that done by an automobile engine. In addition, the fuel is much cheaper.

"But the foregoing facts are rather widely known. The development of synthetics and substitutes in the Axis countries is the factor which really upsets the calculations of those who believe that the answer to the entire problem is merely a matter of adding up the total productions of the various oil fields under Nazi domination and then dividing the result by a figure representing the fuel consumption of the German military organization per day.

"By the beginning of 1939, a tax of 51 cents a gallon had been imposed in Italy on gasoline, and a 36-cent tax in Germany. The reason? To encourage the development of synthetic and substitute fuels. There also were direct subsidies. At that time, about one quarter of all motor vehicle transportation in the Axis countries was accomplished with synthetic or substitute fuels.

"Gasoline made from coal gases was widely used. Alcohol made from vegetables was blended with straight gasoline. There were experiments with ammonia and acetylene. Some 25,000 vehicles in Europe used compressed gases as fuel. The German motorist, who had to pay 60 cents a gallon for gasoline, could use city gas at a price equivalent to 43 cents a gallon. Forty-one cents worth of methane also took him as far as a gallon of gasoline. Propane-butane fuel was more expensive—equivalent to 61 cents a gallon—but one tank full took the motorist some 225 miles.

"Other substitutes for gasoline and oil are oil made by hydrogenation, pulverized coal suspended in oil and oil 'cooked' from corn, wood, algae, seaweed, leaves and similar substances in combination with limestone.

"It is logical to assume that the rapid growth of synthetics and substitutes in Germany has been accelerated by the war. Although facts are hard to obtain since the war began, on either the diesel engine development in Germany or the synthesis of fuel, it appears to me that enough is known for those who predict an early defeat for Hitler on the basis of fuel exhaustion to be more cautious."

Processes To Produce Aluminum from Ores in U. S. Analyzed by Metals Group

REPORT on procedure to be followed in production of alumina from domestic raw materials has been filed with the WPB by the Advisory Committee on Metals and Minerals of the National Academy of Sciences, National Research Council. Dr. Clyde Williams, Battelle Memorial Institute, Columbus, O., is committee chairman. Report bears the signature of Dr. Zay Jeffries, chairman of the Metals Conservation and Substitution Group.

The document is based on the fact that projected production of metallic aluminum in the United States is now seven to ten times the peacetime rate; also that in the past all our aluminum has been obtained from bauxite, part of which was mined in the United States and part in Dutch Guinea. With the Bayer process there has been an incentive in the past to use low-silica bauxite since increases in the silica content result in loss of rapidly increasing quantities of the alumina contained in the ore. Because the war renders it difficult to get ships to bring in bauxite from Dutch Guinea, and because our requirements have increased on so vast a scale, it now becomes necessary to utilize domestic material which would not have been considered under normal conditions.

In reporting on a washing process by which the silica content of high-silica bauxite may be reduced, making the ore available for economical treatment with the Bayer process, the committee states that the original plan to add limestone and soda to the high-silica bauxite and sinter this mixture has been changed. It now is planned, at one plant, first to put all the bauxite directly through the Bayer plant, thus running it entirely on high-silica material. About 70 per cent of the contained alumina will be removed directly. The tailings, or "red mud" (so-called because of the color it gets from contained iron), will then be subjected to the lime-soda sintering operation.

The sintered product will be leached and the liquors will be added to the Bayer process liquors. The tailings from this operation will contain very little alumina.

Recovery of alumina from a ton of high-silica bauxite, treated this way, is expectetd to be about comparable to recovery from a ton of low-silica bauxite when treated with the Bayer process alone.

Report recommends consideration of installation of such sintering plants at the other Bayer process plants in this country. It recommends extraction of alumina in millions of tons of "red mud" that have accumulated during the years that the Bayer process has been in use.

It recommends a modified Pedersen process for production of alumina from clay in which there is no dependence on a Bayer plant. This process, in brief, consists of sintering the clay with lime and subsequently leaching with soda; further research work will be required to develop this process.

The committee reports that work also is going forward with an acid process for the treatment of alunite; this shows promise.

Information taken from "Steel"

Experts estimate that approximately 24,000,000 tons of "outside" scrap will be required in 1942 to keep the steelworks and foundries operating at maximum capacity. "Outside" scrap is that collected from sources other than the mills and foundries themselves.

To obtain this tonnage in 1942 and to provide for the requirements of 1943 will necessitate the collection of a considerable volume of iron and steel scrap from abnormal sources. In other words, the scrap usually obtained from manufacturing operations, from railroads, public utilities, farms, etc., will not be sufficient.

One abnormal source of scrap which can be tapped in this emergency is idle equipment and supplies in manufacturing plants. In Erie, Pa., a committee of seven undertook to seek out old patterns, jigs, fixtures, moulds, rolls, dies, abandoned crane runways, etc., in Erie's diversified industrial establishments. Salvage detectives uncovered 4000 tons of choice material in a short time.

If this search were conducted with similar vigor in every industrial establishment in the country, at least 3,000,000 tons of metal would be recovered.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Molybdenum Company
500 Fifth Avenue • New York City

MOLY

By A. H. ALLEN *Detroit Editor, STEEL*

MIRRORS of MOTORDOM

DETROIT

Nelson pays tribute to "know-how" and ingenuity of automotive industry's management and workers. Urges continued "search for ways of doing more, faster, with less"

"DURING this calendar year factories in the United States will turn out war goods of one kind or another to a value of approximately $45,000,000,000. Next year, I expect that the figure will rise to seventy or seventy-five billions at current prices, and I do not believe that it can ever rise much above that figure, because I think that is just about the limit our economy can stand. The materials which would be needed to get production substantially higher than that simply are not available, and as far as we can see now they cannot be made available. But in any case, getting to the forty-five billion dollar level this year will be a splendid achievement, and raising the level to seventy-five billions next year will be nothing less than magnificent."

So spoke Donald M. Nelson, WPB director, to 1300 executives from the automotive industry and its parts suppliers, gathered here July 10 to signalize the first birthday of the automotive council for war production. Mr. Nelson flew here from Washington to address the formal banquet—$4 per plate—concluding the day's festivities. He did not arrive until about 5 p.m. and the council staff was biting its collective nails all day for fear inclement weather would force the WPB chief to cancel his trip. A private wire to the capital was being held open so Mr. Nelson could telephone his remarks in the event of an emergency.

The speakers' table at the banquet was a cross section of the brass hats of the automotive industry throughout the Middle West, and seldom has such a collection of industrial talent been assembled at one time. It was significant of how the industry has swept aside all competitive barriers and joined hands in the common task of production. Perhaps also significant was the fervor and enthusiasm shown by the entire assemblage in singing the national anthem prior to the program's start.

Pointing out that the automotive industry's share of war production now represents about one-sixth of the entire national effort, Mr. Nelson emphasized the tremendous responsibility resting on the shoulders of the industry. He noted that in May the industry turned out $63,000,000 worth of aircraft engines and $24,000,000 worth of tanks, but he added that by the end of this year aircraft engine production must be pushed up to $150,000,000 a month and tank production must be quadrupled.

"But brawn alone will not win this battle of production," Mr. Nelson continued. "It takes brains as well. We have not only got to work harder than we ever worked before—we have got to work more intelligently. We have got to find every possible way of making one hour's work do the task of two—of making one pound of vital material do what formerly took two pounds. I am going to ask this industry to take the lead in bringing this about.

"'I feel that the greatest single contribution which the automotive industry will make to our war effort will come right in this connection. One of the finest things I have seen in our war program is the way in which the men of this industry—from engineers and executives all the way down to the men at the benches—have applied their knowledge of machines and materials, their know-how in the mass production field, to this very difficult task of getting speedy volume production of munitions.

"The word ingenuity is the key word all the way through. You men have been extremely ingenious in adapting your industry to war production, ingenious in finding ways to make an old machine do the job instead of getting a new one specially made for the purpose, ingenious in saving material by cutting down on the size of the casting that goes to be machined, ingenious in working out simple little steps to save labor and machine time in the fabrication of complicated bits of war materiel.

"If I could give you just one message tonight I would like to say—continue to be ingenious. Never for a moment let up in your search for ways of doing more, faster, with less. You have the chance to revolutionize the whole art of producing for war. And until victory has been won this nation's only thought must be producing for war."

For one of the first times since the war effort began in this country, attention was called to the im-

New Dodge Army Truck

ONE of the newest types of Army trucks being produced by the Dodge division of Chrysler Corp., in Detroit, this "low silhouette" model is easier to conceal in brush and tall grass than previous models, and a lower center of gravity also makes tipping more difficult. F. J. Lamborn (right), Dodge production manager, and J. W. Hutchins, assistant general sales manager, are shown in the new truck which, with a command-reconnaissance car and an army carryall, will tour Army camps for the next three months to familiarize personnel with the new vehicles

portance of so-called civilian production. The WPB chief cautioned that in an all-out effort we cannot make a distinction between civilian and military production, the military effort resting squarely upon the civilian effort. Specifically, he said, "if we should pare our civilian economy down too fine, in our effort to put every possible bit of strength into war production, we should run straight into disaster. People must be fed and housed and clothed, they must be able to get to and from work, they must have the varied kinds of equipment with which their work is done. The production which is needed in order to meet that bill of particulars is every bit as important as the production which is needed for actual war goods—and I do not like to speak of it as civilian production. I much prefer to call it nonmilitary production."

Granting the importance of letting military organizations determine their own needs, Mr. Nelson emphasized that the direction of the national economy as a whole must rest in civilian hands. He predicted that the recently realigned organization of the WPB gives the machinery by which the proper balance in overall production can be maintained.

This matter of balance in production was cited as the most important single objective toward which the WPB now is working by Robert R. Nathan, 34-year-old chairman of the board's planning committee, in a press conference here preceding Mr. Nelson's address. Mr. Nathan impressed his audience as a clear-thinking, outspoken individual with a comprehensive grasp of the military and economic situations. Of necessity, his comments were of a broad theoretical and statistical nature since he has had little production experience, his career having centered around serv-

(*Please turn to Page* 113)

Ford Experiments with Steel Castings for Aircraft

EXAMPLES of progress made by Ford Motor Co. foundry technicians in adapting cast steel to aircraft and aircraft engine requirements is shown in the two accompanying illustrations. Above are shown cast steel crankcase sections to replace forged aluminum alloy. Assembly of front, center and rear sections is shown on the table, upper photo, the three individual castings adjoining; while at the right is the green sand mold in which the center section is cast. At present the steel assembly is a little heavier than its aluminum counterpart, but design changes are expected to bring them down to a parity. Steel is Ford No. 6 analysis, with high carbon and high silicon. Casting these pieces relieves pressure on aluminum forging capacity, which is serious, but performance data on steel castings of this type at low temperature are, to say the least, meager.

Lower illustration shows an ingenious adaptation of centrifugal casting in an airplane landing gear pivot. Hitherto this part has been built up by welding 18 separate pieces of rolled steel into the section shown on the table in the foreground. Of the three pieces, the two at the left are conventional design; the third is centrifugally cast. By casting the part, a saving of 15 feet of welding is achieved, and the part is 3 pounds lighter. In tests,

the casting withstood a load far in excess of design load. Because of the boss on one side, the design does not have a symmetrical cross section; hence in centrifugal casting the mold must be counterbalanced on the side opposite this boss. By this means the rotating mold is brought into balance, except for the few seconds before it has been filled with molten metal. On the table in the right background is a main strut axle casting which replaces a forging and saves 25 per cent of the tools and fixtures required to machine the forging. To the rear of this part is a single aluminum alloy stamping for the pilot's enclosure on a bomber, developed to replace a built-up assembly requiring scores of dies and fixtures for forming and assembling.

MORE AND MORE *Production*
"ON THE WAY"
With Microfinished Precision

Stock removal, up to .060" or .075" at rates as high as 65 cubic inches per hour, to generate correct size, straightness and roundness, is the dominant feature of Micromatic Honing. The Micromatic Honing Process (available with Automatic Microsize for bores up to 2" in diameter and 6" long) will generate uniform size within .0002" to .0005"—bore accuracy within .0001" to .0002"—removing sufficient stock to get the desired results. Applications to ordnance have included gun tube honing, before and after rifling—gun case honing—internal honing of recoil cylinders—external honing of recoil pistons—reconditioning in placement of worn gun tubes up to 16" caliber.

Typical gun barrels regularly honed in production by Micromatic equipment include 50 caliber machine guns—20 millimeter cannon, 37 millimeter cannon, as well as other and larger calibers up to and including 16" and 18", and from 30" up to 75 feet in length.

*

External honing of recoil piston rods generates accuracy within .0001" to .0003" and any desirable finish.

*

Recoil cylinders Micromatic honed. Circular illustration—looking down the bore. The regularity of the eccentric rings (a phenomenon of smooth surface finish) evidences round and straight accuracy generated in typical ordnance applications within .0005" to .0007" as measured with both star and electric gauges.

*

Typical of tooling used for honing large caliber guns is this hydraulically actuated tool. This tool was designed for bores 18" in diameter, 62 feet long.

MICROMATIC HONE CORPORATION
1345 E. MILWAUKEE AVE. DETROIT, MICHIGAN

WING TIPS

Aircraft engine production at rate of 900,000,000 horsepower annually in sight . . . Automakers' output has not yet reached that of old-line builders . . . Standard tools used to advantage

AIRPLANE engine manufacture is well on the way to becoming truly mass production, even in the automotive man's definition of the term. According to present plans, by the end of 1943, two radial engine builders, with their allied suppliers, will be turning out something like fifty million horsepower a month. Add to this the output from plants supplying liquid-cooled engines and the production of some other aircraft engine builders, and the staggering total of 75,000,000 horsepower a month appears likely.

This is far more horsepower than automobile engine builders ever turned out even in the most fertile month in their prolific history. The world has seen nothing like it—airplane engines at a rate of 900,000,000 horsepower a year.

Two suppliers in the radial engine field are Pratt & Whitney and Wright Aeronautical Corp. They operate about neck-and-neck as far as volume of output goes and size of individual engines is concerned. At present there are roughly four sizes of radial engines—those in the 450-550 (takeoff) horsepower class, used in training planes and in tanks; those in the 1200-1400 horsepower range for medium and heavy bombers; those in the 1800-2000 horsepower category for pursuit ships and bombers; and finally the new super-engines in still higher horsepower class for super-bombers and pursuits now in the preliminary stages.

These two principal builders of radial engines are not too far apart even on the designs of their respective power plants, but they do have two different philosophies as far as policy for building up to mass production is concerned. The Wright people prefer to build and operate their own plants, although of course Studebaker and Chrysler have now been drawn into their picture. Pratt & Whitney, on the other hand, feeling that it was a little short on topside personnel to manage and operate its own plant, has preferred to license established companies to build its various types of engines. Thus we see Buick, Ford, Chevrolet, Nash-Kelvinator, Jacobs and Continental gearing up large plants to supplement the outpouring of Pratt & Whitney radials from the sprawling plants at East Hartford, Conn.

When the automotive companies first announced their entrance into the radial engine field, many of the wiseacres nodded their heads sagely and said: "Well, now we will really see some production. These automotive boys will show those radial engine people some tricks in turning out stuff in quantities."

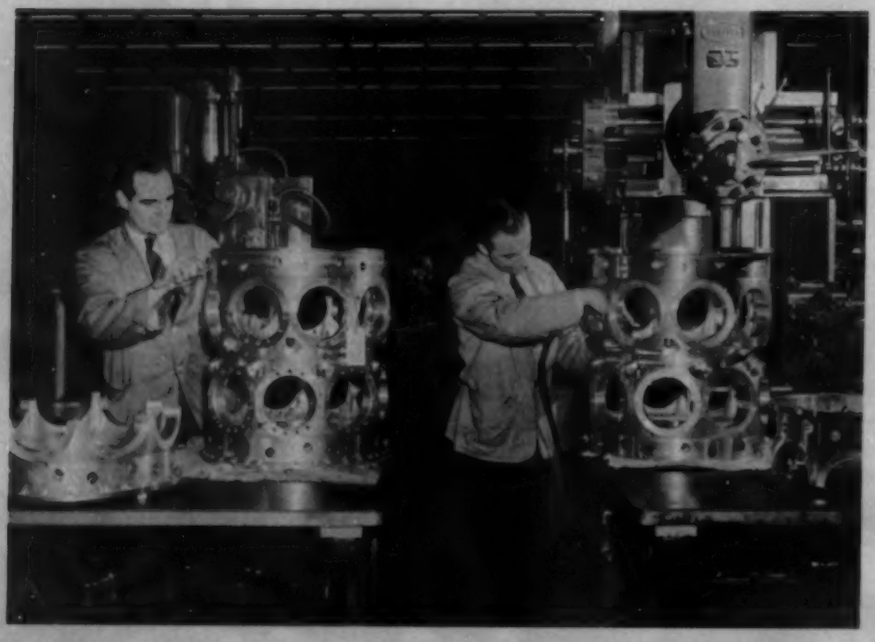
It is now nearly two years since Ford decided to go ahead with a large new plant to build P and W engines. Similarly, Buick has spent about 18 months in getting set to turn out 1200-horsepower P and W's in volume. Chevrolet at Tonawanda, N. Y., has been equipping several plants there for the past year and is just now beginning production. Nash has yet to get under way. Still the total number of engines coming from these plants is only one-tenth of the total number built by Pratt & Whitney in the last two years.

Special vs. Standard Tools

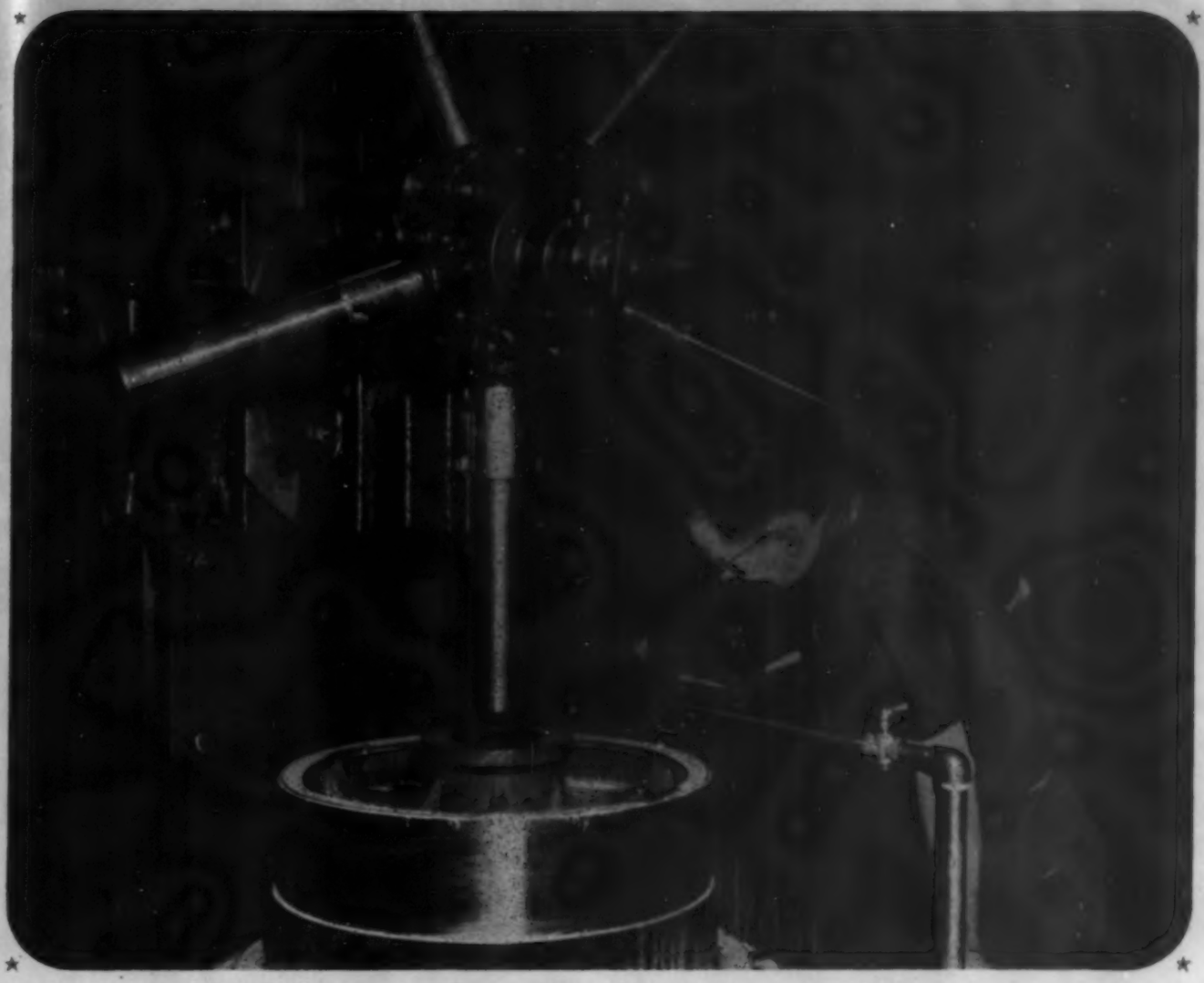
This is not intended to reflect adversely on the automotive companies, whose engineers have done a marvelous job, but actually as yet they have taught the licensor no "tricks" in mass production with which it was not already familiar.

One of the most important differences between the general manufacturing policy of the engine builders like Pratt & Whitney and the automotive companies is in the matter of types of tools selected. It has always been the practice of P and W engineers to lay out any manufacturing process on the basis of using standard types of machines and machine tools to which are added special jigs and fixtures. In contrast to this, the general automotive technique has been to design and build special-purpose machines which can be manned by less-experienced operators and will turn out parts in greater volume than the standard machines with special fixtures, many of which require skilled operators.

The difficulty with special-purpose machines is that they do not lend themselves so well to accommodating design changes. They are fine in production of automobiles, where designs are more or less frozen at the start of a model year. They represent one of the principal reasons why American automobiles can be built and sold at comparatively low cost. In airplane engines, small design changes are frequent. As an example, take the case of one Pratt & Whitney engine in which there were 64 changes after engine went into the production line. All of these were effected without interrupting manufacturing, an achieve-



GLEAMING metal that will become part of Pratt & Whitney airplane engines for the United States Army is being worked by expert hands in the Ford plant at Dearborn. These huge aluminum forgings are crankcases for the engine, with the apertures showing the arrangement of 18 cylinders in a double row



THERE'S MORE THAN ONE SHOT IN THE TOOL STEEL MAGAZINE

FOR every machining job, there is a tool steel which will produce optimum results as regards the amount of work done per machine hour and per grind.

Teaming up the right tool steel with the job frequently shows phenomenal improvement. For instance, with a connecting rod broach made of DBL High Speed Steel, a well-known engine builder secured 13,533 pieces for the life of the broach, against a previous best average of 8000 pieces. The increase is almost 70%. A similar company, using 3/8" twist drills made of DBL, secured an average of 30% more holes per grind than with 18-4-1.

War production calls for the best possible performance from every machine tool, new or old. Let our engineers help you to determine the right tool steels to use on your jobs, for improved results. At the same time, they'll make you familiar with the best *alternate* steel, for your protection in the event of possible future shortnesses in supply.

Allegheny Ludlum
STEEL CORPORATION
GENERAL OFFICES: PITTSBURGH, PENNSYLVANIA

ment hardly possible when processing equipment is all of the special-purpose type.

Much has been said about the subject of tolerances in airplane engine manufacturing. As far as dimensional tolerances are concerned, they do not differ radically from automotive practice. But in the matter of fits and finishes, there is a sharp difference. Fits in an airplane engine are much closer than in an automotive practice, which is to say clearances are less; finishes are likewise much more important, parts in general being machined, ground and lapped all over, with magnaflux inspection relied on to detect microscopic cracks which might be focal points for fatigue failures. Sharp corners and short-radius fillets are "out" in airplane engines for the same reason.

Cost of building airplane engines has been estimated roughly at $10 per horsepower, making an engine for a bomber valued at about $12,000. Obviously these costs will come down as volume moves up, even in spite of higher labor costs. How much is not yet definitely established, but a certain propeller manufacturer finds costs down 20 per cent in spite of a 75 per cent advance in wage rates—explained solely by increasing volume and efficiency of operation. Certainly $10 per horsepower is far out of line for automobile engines, which come closer to $1 per horsepower. But perhaps it is not fair to compare 21-jewel movements with spring-driven alarm clocks.

Special Form Provided for Raising Aircraft Ratings

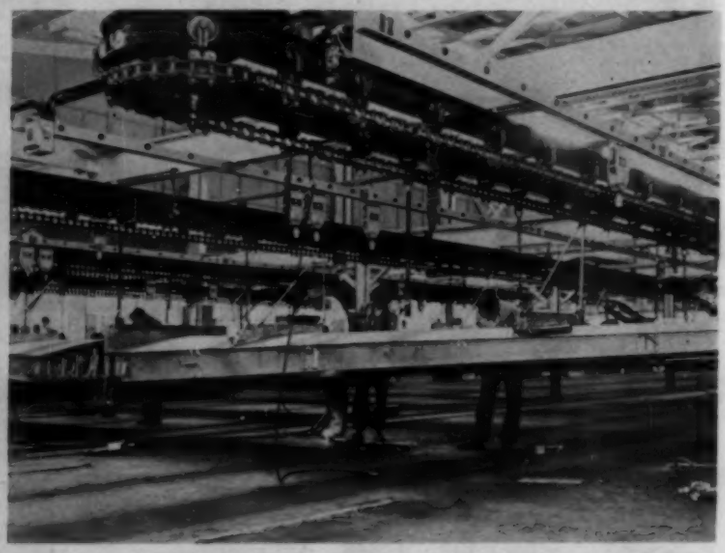
Special form has been prescribed for use by the armed services in raising the level of preference ratings on orders for planes and parts.

Under the terms of Priorities Regulation No. 12, issued June 26, the armed services have been authorized to rerate some outstanding contracts to give preference to a strategic program of military production. In most cases, the higher ratings are assigned only to individual contracts for specific quantities of materiel.

Aircraft production is carried on largely under open-end, continuing contracts and it would disrupt production schedules to rerate these existing contracts without limitation. The new form, PD-4X-1, has been provided for assignment of new ratings to deliveries of specified planes and parts in a definite production period.

Regulation No. 12 permits the assignment of ratings of AAA, AA-1, AA-2, etc., to existing orders of specific authorization from WPB.

Willow Run Plant Nears "Bomber-an-Hour" Goal



PRODUCTION scenes from the Ford Willow Run, Mich., bomber plant. More than 70,000 men and women now are reported employed in the half-mile long, quarter-mile wide factory now rolling air dreadnaughts off the assembly line in auto plant fashion. When in full production, factory will deliver a bomber an hour.

Accompanying photos show: Above, line of heavy presses that stamp out bomber sections, a working method borrowed from the auto industry; upper right, assembling outer wing sections; lower right, jigs where are assembled inner wings. NEA photos

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LABOR

"Labor Priorities" Announced By U. S. Service at Buffalo

BUFFALO

The general industrial picture continues to reflect a quickening in war production, but there are indications that lack of labor may soon check the upsurge. Leo A. Sweeney, district superintendent of the United States Employment Service, reports that labor-supply priorities for war industries have been established "as a rigid operating policy of the service". These priorities will be accorded on the following basis:

1. Establishments holding war contracts.
2. Establishments holding subcontracts from war contractors.
3. Establishments providing equipment and supplies for war contractors or their subcontractors.
4. All phases of agriculture.
5. Essential civilian activities such as public utilities, transportation, hospitals, etc.

12,500,000 Now Employed in War Industries; 5,000,000 To Be Added

War plants rapidly are drying up the available supply of labor, Chairman Paul V. McNutt of the War Manpower Commission said last week.

Approximately 12,500,000 persons are working in direct war employment, including war plants and transportation, power production and governmental employment directly connected with the war.

"War employment has practically doubled in the seven months since Pearl Harbor," Mr. McNutt said.

"Under present schedules, 5,000,000 more will be added to the war industry force during the last six months of 1942."

General labor shortages are apparent in many war industry centers and will spread rapidly in the next few months.

The new war employment estimate of 12,500,000 compares with previously announced estimates of 9,000,000 on April 1 and 6,900,000 on Jan. 1. The average war employment for the last three months of 1941, most of it "pre-Pearl Harbor," was 5,300,000. The fourth quarter figure in 1940 was 1,400,000.

Mr. McNutt pointed out that the total increase in war employment in the second quarter totaled 3,500,000, an increase of 67 per cent over the 2,100,000 total of the first quarter.

"We counted on obtaining, for the armed forces and for industry, between 7,000,000 and 8,000,000 persons from peacetime industry during this calendar year, in addition to 1,400,000 of the employable unemployed, 2,000,000 or more from housewives, young people, older workers and others not in the labor market. Obviously, the employment of 5,600,000 by war industry in six months, plus the number taken by the armed forces, has absorbed most of the workers who were immediately available. We must move more quickly now to utilize our reserves —our women, Negroes, older workers, disemployed white-collar workers, aliens and others."

"Serious Manpower Shortage May Develop by Year's End"

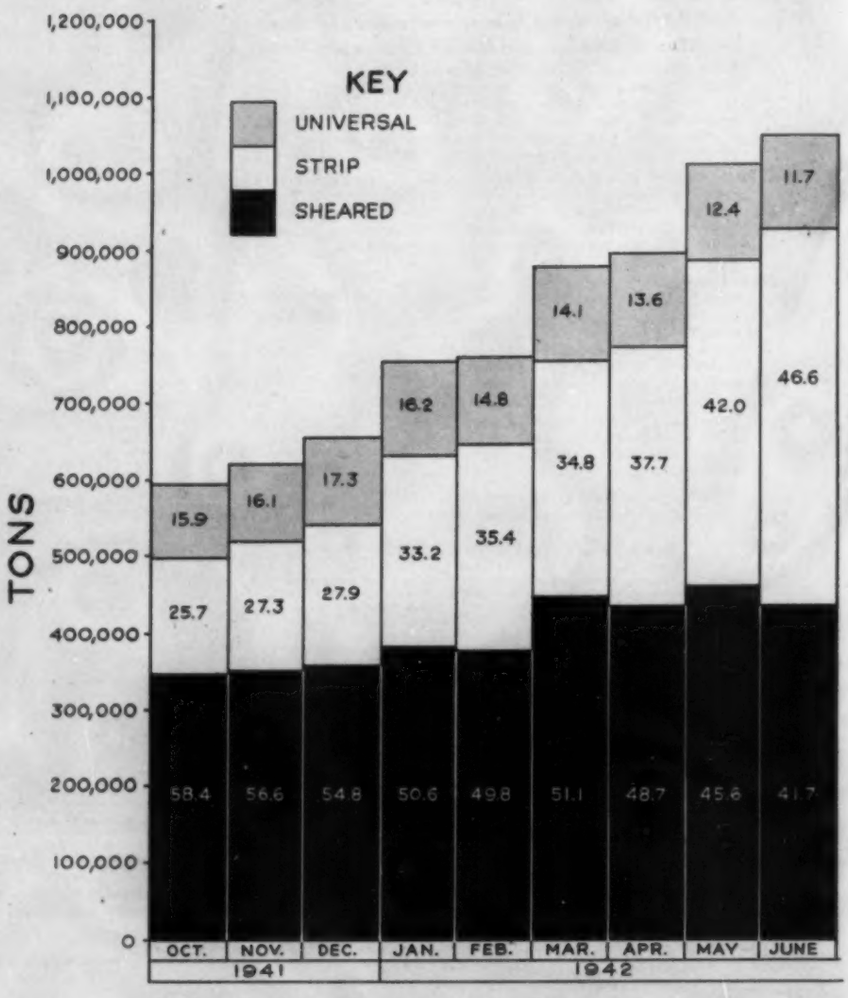
Business prospects have become the prospects of the war, according to the Cleveland Trust Co.'s monthly *Bulletin*.

Recent developments make it appear probable that large numbers of American troops will be engaged in combat, and that shortages of civilian goods will be severe. Our worst shortages from the national point of view are going to be those of scarce materials of man power, and of shipping, it states.

Probably shortages in civilian goods will begin to be generally felt at about the time that there is general realization that the man power shortage is becoming serious. This situation might develop by the end of this year.

American Gear Manufacturers Association, Wilkinsburg, Pa., reports industrial gear sales in June were 12.7 per cent below those of May and 24.7 above June, 1941. Total for six months ending with June was 35.6 per cent above the comparable period last year. The compilation does not include automotive gears or gears for high-speed turbines.

Steel Plate Shipments—by Type of Mill



	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June
Univ.	94,311	99,828	113,467	122,227	111,965	123,152	121,838	125,608	123,114
Strip	152,440	169,311	182,604	250,396	268,988	306,195	337,519	425,211	489,704
Sheared	346,401	350,868	358,273	381,899	377,770	449,379	436,614	461,375	438,144
Total	593,152	620,007	654,344	754,522	758,723	878,726	895,971	1,012,194	1,050,962

(Figures by War Production Board. Those in chart columns are percentages.)

Activity Index Revised To Meet War Conditions

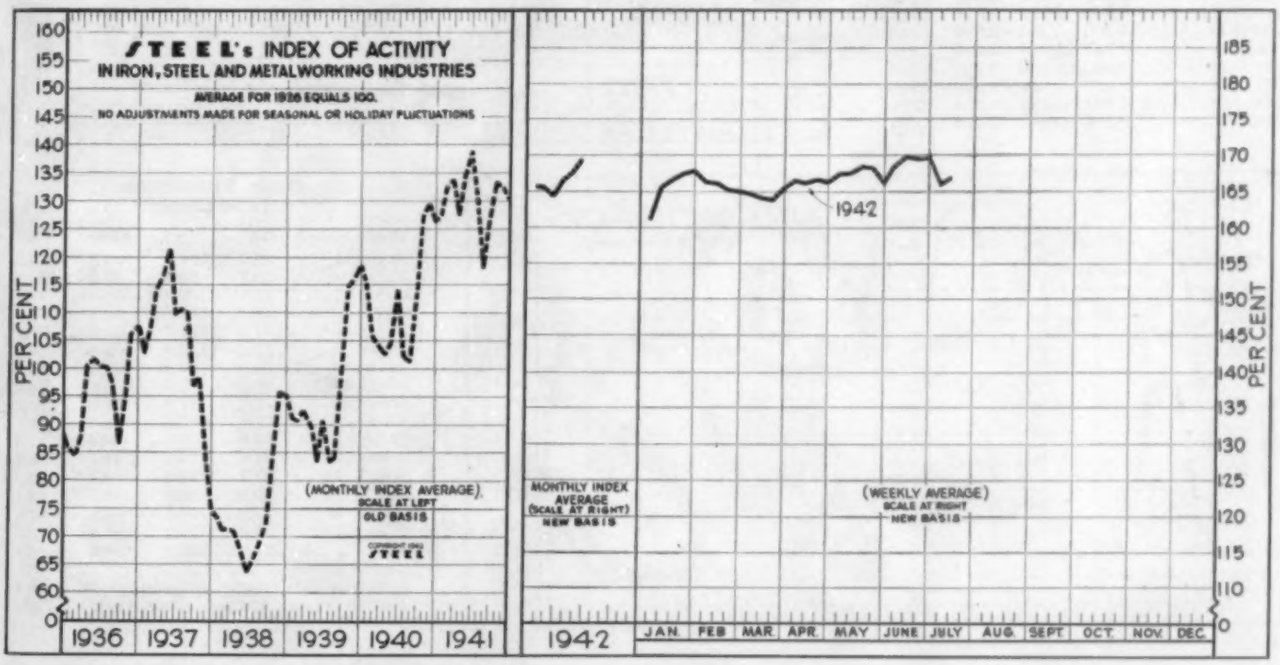
IN ORDER to reflect industrial activity under wartime conditions more accurately, STEEL has revised its index of activity in the iron, steel and metalworking industries.

Originally the index was based upon four indicators —steelworks operating rate, electric power output, revenue freight carloadings and automobile production. Weekly figures were used. The weights allotted to these factors were 40, 20, 20 and 20 respectively.

Several wartime developments have tended to outmode this weighting. Automobile production was curtailed to the point where it was not a criterion of the activity of the facilities of the automotive industry, now largely engaged in war production. Steelmaking capacity has been and is being expanded at a rate far above normal. Thus the steelworks operating rate does not reflect the steady increase in actual production caused by increases in capacity.

To compensate for these wartime conditions, STEEL has dropped automobile output as an ingredient of the index and has weighted steel at 50, power output at 25 and revenue carloadings at 25. At the same time it is using a figure for steel which relates the weekly operating rate to periodic increases in steelworks capacity.

These changes have the effect of lifting the index appreciably. The current figure of 167.1 would have been 140 on the old basis. The new method of calculation has been carried back to Jan. 1, 1942. The year 1926 remains the base year.



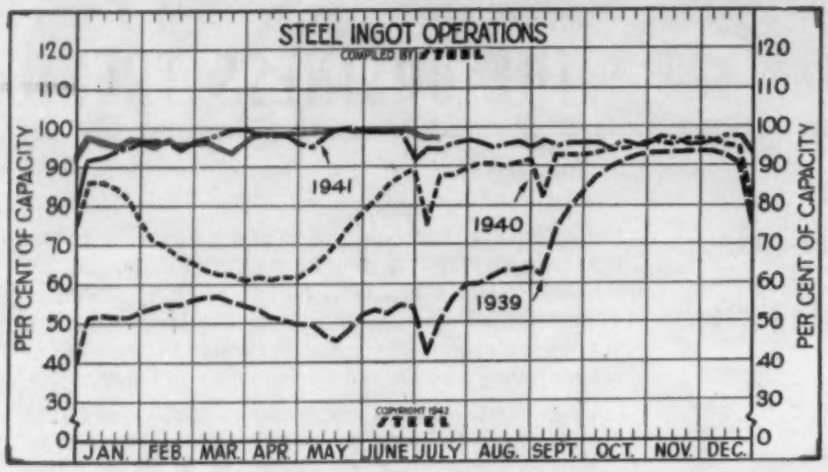
STEEL's index of activity gained 1.2 points to 167.1 in the week ending July 11:

Week Ended	1942	1941
May 9	167.7	135.9
May 16	168.4	136.1
May 23	168.3	138.6
May 30	166.2	128.4
June 6	168.6	138.4
June 13	169.8	138.7
June 20	169.5	138.7
June 27	169.8	138.8
July 4	165.9	120.9
July 11	167.1†	133.4

†Preliminary.

Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Jan.	165.7	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1
Feb.	165.6	132.3	105.8	90.8	71.1	106.8	94.3	82.0	73.9	48.2	55.3	75.5
March	164.6	133.9	104.1	92.6	71.2	114.4	97.7	83.1	78.9	44.5	54.2	80.4
April	166.7	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0
May	167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6
June	169.4	138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1
July	.....	128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3
Aug.	.....	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4
Sept.	.....	126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3
Oct.	.....	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2
Nov.	.....	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4
Dec.	..	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3

Note: Weekly and monthly indexes for 1942 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production.



Steel Ingot Operations

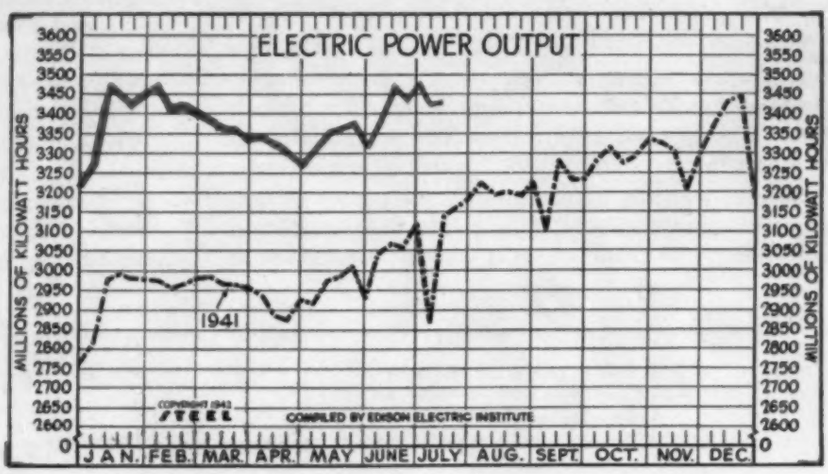
(Per Cent)

Week ended	1942	1941	1940	1939
July 11	97.5	95.0	88.0	50.5
July 4	97.5	92.0	75.0	42.0
June 27	98.5	99.5	89.0	54.0
June 20	99.0	99.0	88.0	54.5
June 13	99.0	99.0	86.0	52.5
June 6	99.0	99.0	81.5	53.5
May 30	99.0	99.0	78.5	52.0
May 23	99.0	100.0	75.0	48.0
May 16	99.5	99.5	70.0	45.5
May 9	99.0	97.5	66.5	47.0
May 2	99.0	95.0	63.5	49.0
April 25	98.5	96.0	61.5	49.0
April 18	98.5	98.0	61.5	50.5
April 11	98.5	98.0	61.0	51.5
April 4	98.0	98.0	61.5	53.5
Mar. 28	97.5	99.5	61.0	54.5
Mar. 21	95.5	99.5	62.5	55.5
Mar. 14	95.5	98.5	62.5	56.5

Electric Power Output

(Million KWH)

Week ended	1942	1941	1940	1939
July 11	3,429	3,141	2,652	2,403
July 4	3,424	2,867	2,425	2,145
June 27	3,457	3,121	2,660	2,386
June 20	3,494	3,056	2,654	2,362
June 13	3,464	3,066	2,665	2,341
June 6	3,372	3,042	2,599	2,329
May 30	3,323	2,924	2,478	2,186
May 23	3,380	3,012	2,589	2,778
May 16	3,357	2,988	2,560	2,235
May 9	3,351	2,975	2,516	2,239
May 2	3,305	2,915	2,504	2,225
April 25	3,299	2,926	2,499	2,244
April 18	3,306	2,874	2,529	2,265
April 11	3,321	2,882	2,530	2,235
April 4	3,349	2,938	2,494	2,244
Mar. 28	3,346	2,956	2,524	2,272
Mar. 21	3,357	2,964	2,508	2,238
Mar. 14	3,357	2,965	2,530	2,276
Mar. 7	3,392	2,987	2,553	2,285


ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1941
COPYRIGHT 1942 STEEL
COMPILED BY EDISON ELECTRIC INSTITUTE
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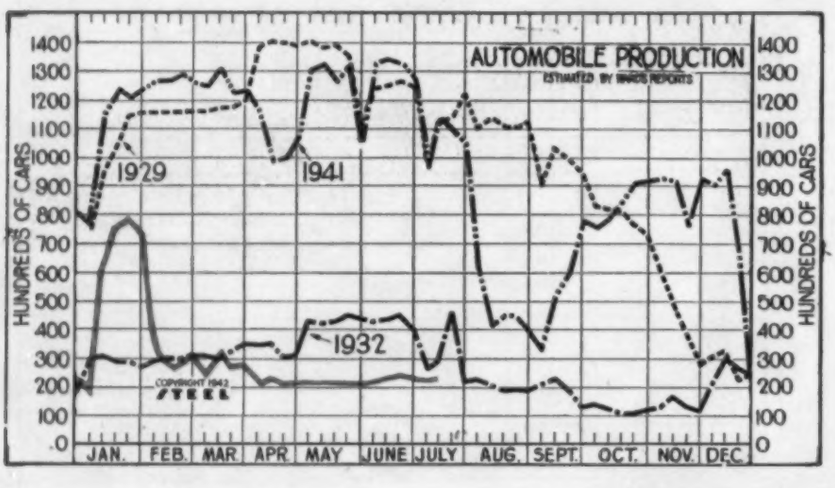


Auto Production

(1000 Units)

Week ended	1942	1941	1940	1939
July 11	23.0	114.3	65.2	61.6
July 4	22.7	96.5	52.0	42.8
June 27	22.9	127.9	87.6	70.7
June 20	23.2	133.6	90.1	81.1
June 13	22.3	134.7	93.6	78.3
June 6	22.0	133.6	95.6	65.3
May 30	21.5	106.4	61.3	32.4
May 23	21.6	133.6	96.8	67.7
May 16	21.8	127.3	99.0	80.1
May 9	21.5	132.6	98.5	72.4
May 2	22.0	130.6	99.3	71.4
April 25	21.9	108.2	101.4	86.6
April 18	21.7	99.9	108.7	90.3
April 11	23.0	99.3	101.9	88.1
April 4	22.3	116.3	101.7	87.0
Mar. 28	28.9	124.2	103.4	86.0
Mar. 21	28.9	123.8	103.4	89.4

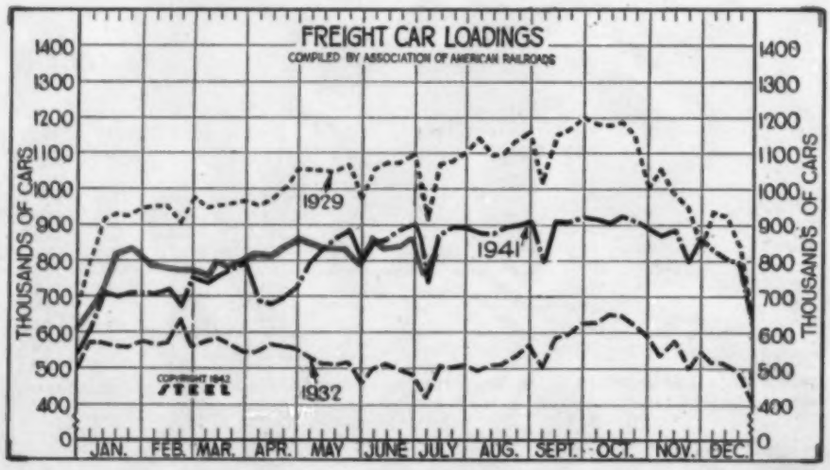
†Canadian trucks and automobiles and United States trucks, since week of Feb. 21 last.

Freight Car Loadings

(1000 Cars)

Week ended	1942	1941	1940	1939
July 11	805†	876	740	674
July 4	759	741	637	559
June 27	853	909	752	666
June 20	840	886	728	643
June 13	833	863	712	638
June 6	855	853	703	635
May 30	796	802	639	568
May 23	838	866	687	628
May 16	839	861	679	616
May 9	839	837	681	555
May 2	859	794	666	573
April 25	855	722	645	586
April 18	847	709	628	559
April 11	814	680	619	548
April 4	829	683	603	535
Mar. 28	805	792	628	604

†Preliminary.

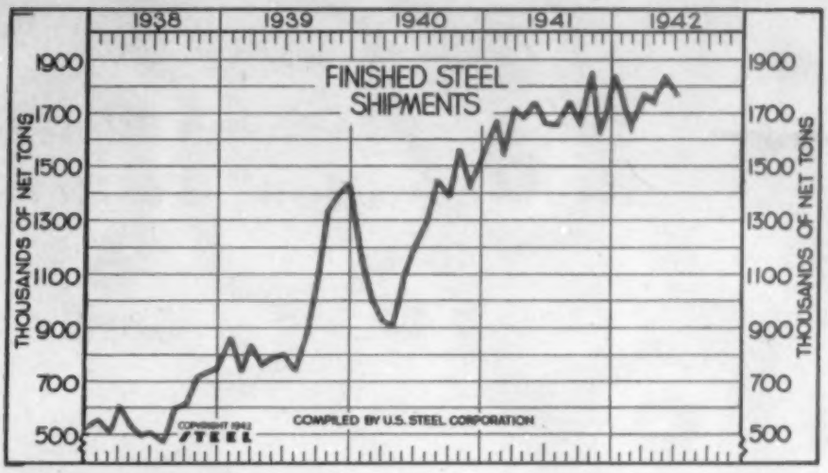


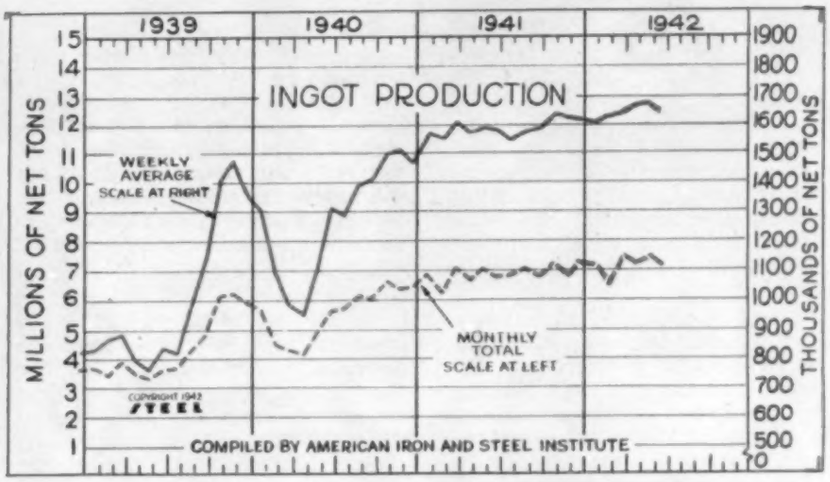
Finished Steel Shipments
U. S. Steel Corp.

(Unit 1000 Net Tons)

	1942	1941	1940	1939	1938
Jan...	1738.9	1682.5	1145.6	870.9	570.3
Feb...	1616.6	1548.5	1009.3	747.4	522.4
Mar...	1780.9	1720.4	931.9	845.1	627.0
Apr...	1758.9	1687.7	907.9	771.8	550.5
May..	1834.1	1745.3	1084.1	795.7	509.8
June .	1774.1	1668.6	1209.7	807.6	525.0
July..	.....	1666.7	1296.9	745.4	484.6
Aug. .	.....	1753.7	1455.6	885.6	615.5
Sept. .	.....	1664.2	1392.8	1086.7	635.6
Oct...	.....	1851.3	1572.4	1345.9	730.3
Nov. .	.....	1624.2	1425.4	1406.2	749.3
Dec...	.....	1846.0	1544.6	1444.0	765.9
Tot.†	.....	.....	15,013.7	11707.3	7315.5

†After year-end adjustments.





Steel Ingot Production

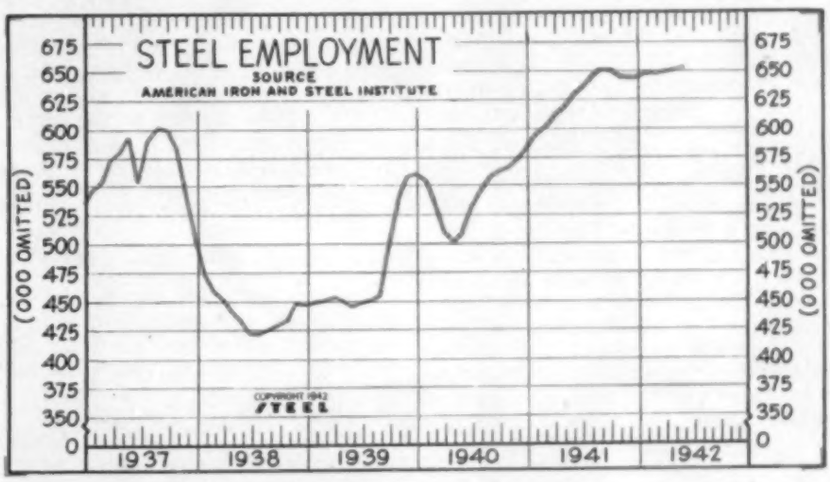
(Unit 100 Net Tons)

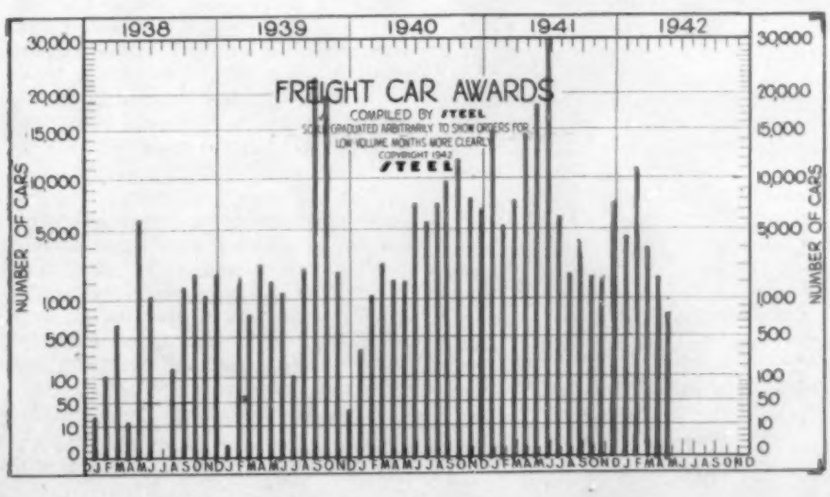
	Monthly Total		Weekly Average	
	1942	1941	1942	1941
Jan....	7,124.9	6,922.4	1,608.3	1,562.6
Feb....	6,521.1	6,230.4	1,630.3	1,557.6
March.	7,392.9	7,124.0	1,668.8	1,608.1
April..	7,122.3	6,754.2	1,660.2	1,574.4
May...	7,386.9	7,044.6	1,667.5	1,590.2
June ..	7,022.2	6,792.8	1,636.9	1,583.4
July...	.....	6,812.2	.....	1,541.2
Aug. ..	.....	6,997.5	.....	1,579.6
Sept..	.....	6,811.8	.....	1,591.5
Oct....	.....	7,236.1	.....	1,633.4
Nov. ..	.....	6,960.9	.....	1,622.6
Dec....	.....	7,150.3	.....	1,617.7
Total..	.....	82,836.9	.....	1,588.7

Steel Employment

(000 omitted)

	1942	1941	1940	1939	1938
Jan.	651	598	556	451	475
Feb.	651	603	538	453	461
Mar.	653	613	514	455	455
Apr.	654	621	503	452	445
May	656	632	510	448	436
June	...	638	535	451	425
July	...	648	549	453	424
Aug.	...	654	560	458	427
Sept.	...	652	565	502	431
Oct.	...	646	568	545	436
Nov.	...	645	577	561	450
Dec.	...	646	585	563	449





Freight Car Awards

	1942	1941	1940	1939
Jan.....	4,253	15,169	360	3
Feb.	11,725	5,508	1,147	2,259
March....	4,080	8,074	3,104	800
April.....	2,125	14,645	2,077	3,095
May.....	822	18,630	2,010	2,051
June	0	32,749	7,475	1,324
6 mos. ...	23,005	94,765	16,173	9,532
July.....	.....	6,459	5,846	110
Aug.	.....	2,668	7,525	2,814
Sept.	.....	4,470	9,735	23,000
Oct.....	.....	2,499	12,195	19,634
Nov.	.....	2,222	8,234	2,650
Dec.....	.....	8,406	7,181	35
Total...	.....	121,499	66,889	57,775

American Industry Shares Its "Know How" To Reveal

PRODUCTION SHORTCUTS

MORE THAN a score of new engineering developments and ideas that could be used to help speed war production were revealed in a recent demonstration by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Dr. A. A. Bates, who directs chemical and metallurgical work at the Westinghouse Research Laboratories where many of the technical advances were discovered said:

"We believe this demonstration illustrates the willingness of many big companies to share their specialized 'know how' with all American industry to help in this national emergency. It is our hope that the thousands of small factories now working day and night on war production will find these technical advances helpful."

Devices demonstrated ranged from a simple screw-driver-like cotter-pin spreader, Fig. 21, to the elaborate photoelastic setup in Fig. 4 used to study stresses in huge bolts. The nut and bolt, one of the oldest and most common of all fastening devices, defies both mathematical stress analysis and strain measurement. But with the photoelastic analysis, Dr. M. Hetenyi of Westinghouse Research Laboratories discovered that a nut with either a tapered thread or a tapered lip will increase the effective *strength of the fastening as much as* 40 *per cent.*

The discovery was made by using transparent three-dimensional plastic models of bolts. Stresses simulating those in actual service were applied to the models which were held under stress while given a heat "froze" the stresses in the material. When such a model is sectioned and viewed by passing polarized light through it, stress distribution is revealed. Here it showed that maximum stress usually occurs at the thread nearest the bottom of the nut. Using this information, it has been possible to design turbine bolts in which the stresses were more evenly distributed, greatly increasing their effective strength. Since the nut and bolt is a basic fastener, the technique can be applied to many industries.

Instead of 8 *hours,* 15 *minutes now suffices* to determine the grain sizes of metallic powders used by numerous industries in making pressed, molded metal parts. Since the quality of the metal part produced depends on the uniformity of the metal grains, particle size determination is most essential. An electric eye is set up to measure the amount of light passing through a glass tube as shown in Fig. 2. Then 1 gram of the metal powder is mixed with 0.1 quart of acetone and a wetting agent such as isopropyl xanthate and placed in the tube.

Curves Determine Sizes

As the particles settle, the liquid clears, permitting more light to pass to the electric eye. By reading at regular intervals the milliameter that is connected to show light intensity on the electric eye, a series of values are obtained from which a curve is plotted showing the rate at which the specimen clears. Comparing this curve against standard curves for particles of known size, it is possible to determine not only the average size but also the relative quantities of different size particles in the test specimen. Grain sizes as small as 0.00004-inch can be determined.

A newly developed automatic dew-point recorder employs a new electronic tube that can discover *as little as* 0.004 *of* 1 *per cent of water vapor* in furnace gases used in heat-treating work. The recorder is accurate within 1 per cent of dew-point temperature. Since it is automatic, it not only frees the furnace operator from the need for frequently checking the furnace atmosphere, but it can be used to make a continuous record, operate alarms, etc.

A new kink makes it possible to tighten the huge alloy steel bolts for high-temperature high-pressure turbines *without inducing torsional stress.* To insure that they have been stretched just enough to produce the desired stress, these big bolts have a hole down through their center for measuring their length before and after tightening.

In the new method, the nut is tightened on the cold bolt until it is snug. Then an electric heater unit is inserted in the hole through the bolt center and the current applied. The heat developed causes the metal to expand, lengthening the bolt. It requires about 5 minutes per inch of bolt diameter for the bolt to elongate enough to allow the nut to be given a predetermined amount of turn. Since some of these bolts are 6 inches in diameter, up to 30 minutes may be required. Then the heater is removed, and the bolt cooled quickly by compressed air. A special micrometer checks the stretch of the bolt, a measure of the desired stress. Permissible tolerance on the measured length is minus 10 per cent to plus 20. The result is a bolt, tensed to any desired amount, yet without any torsional stress to reduce effective strength of the bolt.

Fig. 1 shows a number of interesting solutions to problems involved in making dies for molding plastic parts, indicative of shortcuts that have made possible *a* 400 *per cent increase in die production* in the Westinghouse mold-making department during the last year.

Extreme left, Fig. 1, shows a

right-angle piece or bracket. First attempts to drift or press the 0.002-inch step on the end of this piece failed as the distortion in heat treating the die caused this drift to be nullified. A small insert with this 0.002-inch step was hardened separately and then fitted into the main die, giving the result desired.

The tiny "button" shown being held in the hand in Fig. 1 is made in a 24-cavity mold, each cavity being precisely the same as the others. The point of junction for the eccentric diameter must be held to an 0.008-inch radius to assure both necessary strength and proper clearance.

To do this, the top die of the mold, which forms the head of the button, is hobbed or cold pressed from a master. Bottom dies are bored in a lathe and then counterbored eccentric with a series of special built drill blocks, gun drills and reamers. The 0.008-inch radius is drifted on this eccentric diameter by means of a master drift which assures the same radius for all the cavities. In final inspections when this 0.008-inch radius is magnified 65 times, the uniformity of all pieces is established.

Manufacturing Cost Cut

Because of the difficulty of putting the scroll design, second from left, in Fig. 1 on paper, the scroll die at right was machined as a reduced duplicate of a model that was eight times the size of the die. Proper curvature and shape were obtained by filing this center core and constantly checking against the model.

A simplified method of making die strippers increases the life of metal stamping dies and improves the quality of the stampings. Stripper accuracy is equal to that of the die. Best of all, *the manufacturing cost is only* 1/3 *to* 1/15 *that of the conventional method,* which is to make the stripper from a single piece by laying out, jig boring, sawing and hand filing the slots. Such a piece is shown at E, Fig. 22. It is extremely difficult to obtain uniform clearance in slots by this method—a factor that hastens die wear.

By the new method, a disk A Fig. 22 of the proper grade of tool steel is machined to the outside diameter of the slot edge. Then equidistant slots are cut on a milling machine using a ground form cutter to obtain the exact slot contour. To this spider B, Fig. 22, an outer ring C is shrunk and copper brazed in a controlled atmosphere furnace at 2050 degrees Fahr. This brazed assembly is then machined as at D and put to use.

Much time is saved by using a tubular drill for extracting solid

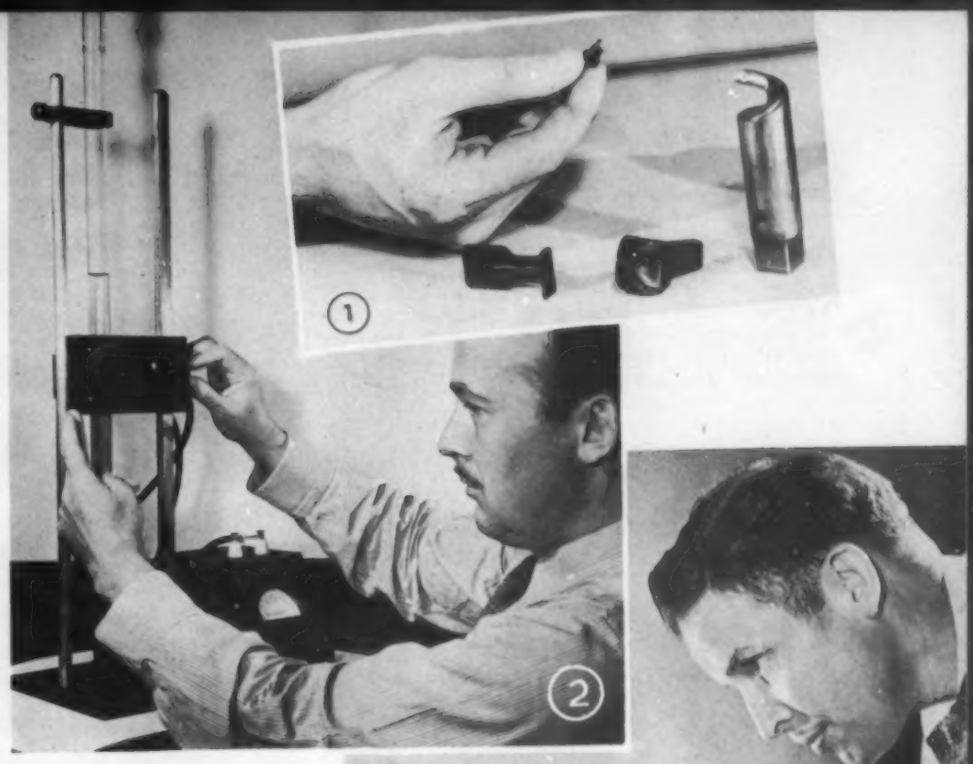


Fig. 1—Molding and die-making kinks help increase die production 400 per cent

Fig. 2—Electric eye reduces grain size test to 15 minutes instead of 8 hours

Fig. 3—Electromagnetic method reveals sub-surface defects in heat-treated parts without touching the surface, thus marring or denting highly polished surfaces is avoided

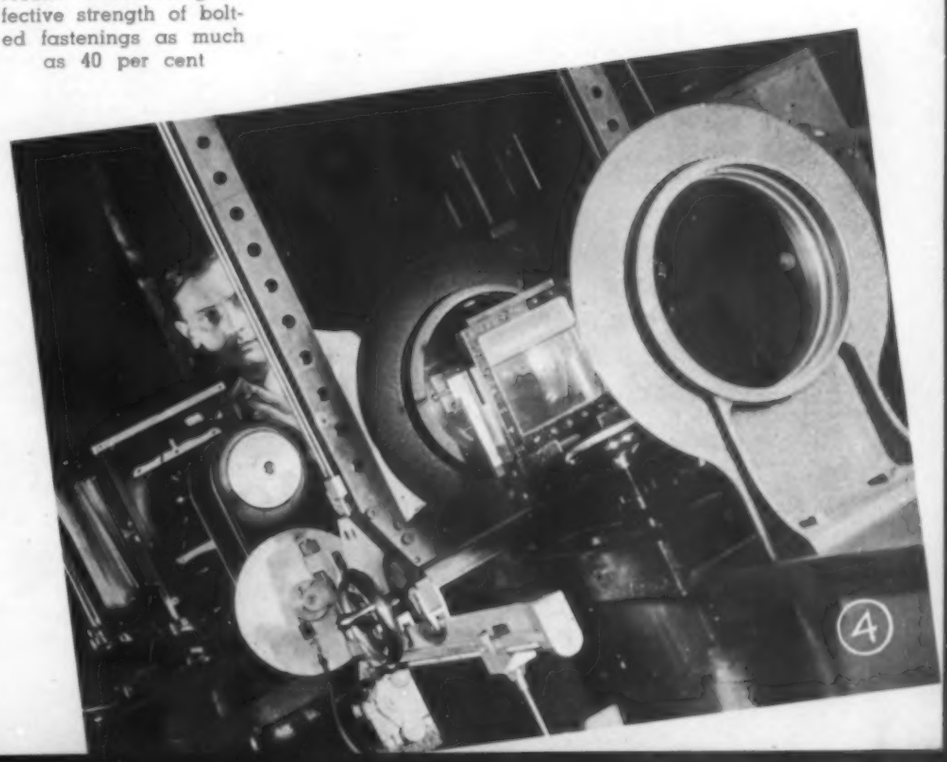
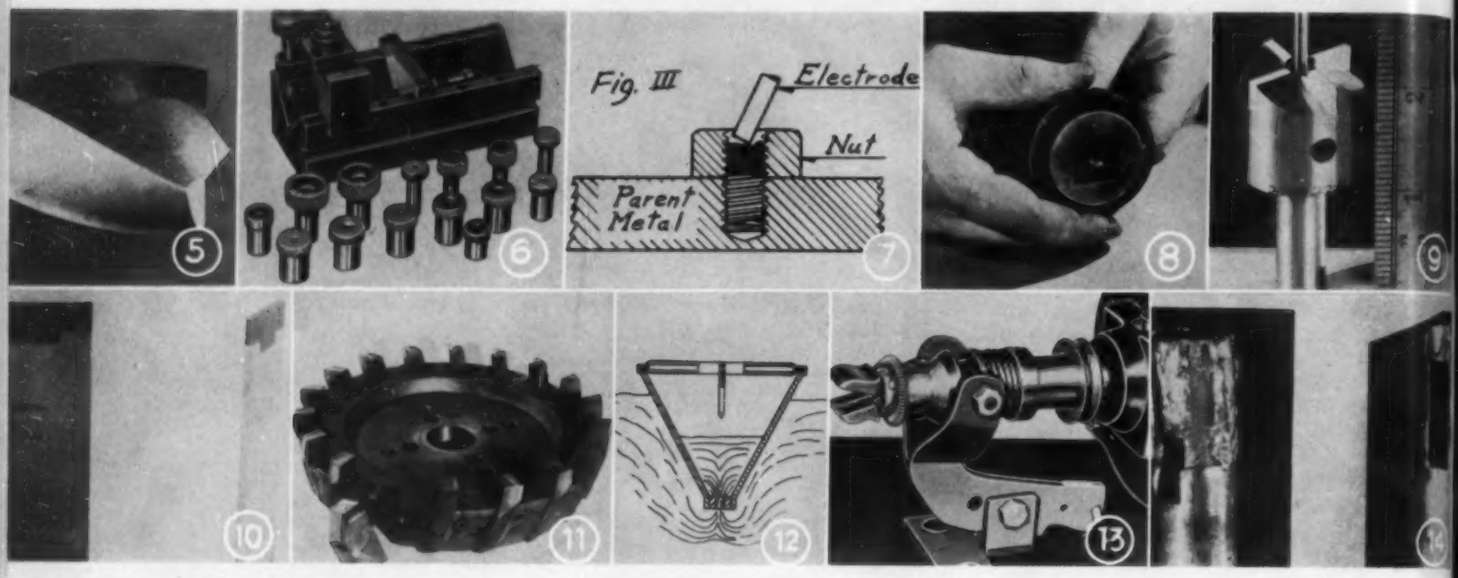


Fig. 4—Setup for photo-elastic study to determine stress distribution results in increasing effective strength of bolted fastenings as much as 40 per cent

test samples from castings, forgings, rolled and welded parts. Also it is usually possible to sample the part being tested without weakening it. Too, the surface of the material (one end of the cylindrical sample) is preserved for inspection. The method replaces the usual slow and laborious sawing procedure.

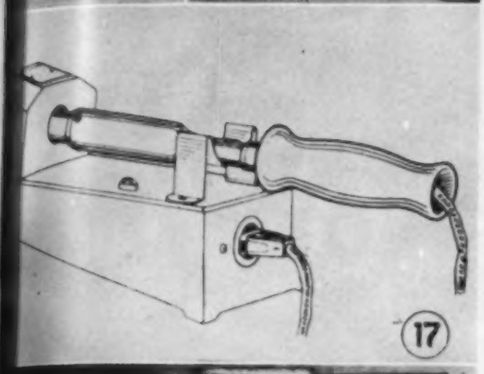
As shown in Fig. 23, the drill is essentially a tubular member having a number of cutting teeth at one end. The spring and pin shown at the right form a removable centering device used in starting the cut. Procedure is to first drill a pilot hole about ⅛-inch in diameter and ⅛-inch deep with a standard twist drill. This is done with an ordinary stationary or portable air, electric or hand drill, no jigs being necessary. Next the twist drill is replaced by the tubular cutting member and the spring and pin placed in it. Centering pin is allowed to extend a little beyond the drill teeth so the nipple of the pin can be inserted in the pilot hole.

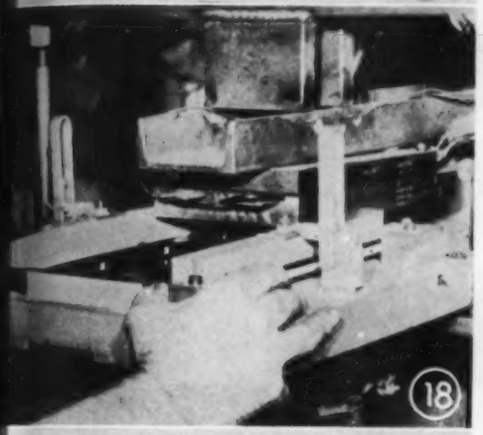
When the drill has cut into the work about a $\frac{1}{16}$-inch, it is withdrawn to permit the pin and spring to drop out. Drilling to the de-

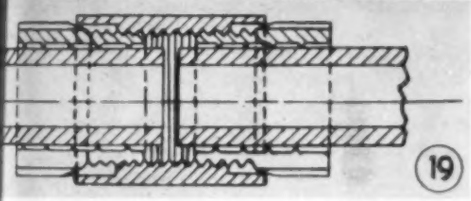


Seventeen Ways To Speed Production

ILLUS.	FOR	BENEFITS	HOW IT WORKS
Fig. 5	Drilling thin sheets	Less burr; improved chip clearance	Drills are ground with a flat spur point and show marked advantage over drills ground in conventional manner
Fig. 6	Drilling variety of holes	More accurate drilling; prevents drills from breaking.	Bushings to accurately guide drills of from ¼ to 1¼ inches in diameter are held in fixture attached to V-block. Jig holds stock up to 4 inches long. Bushings interchangeable. Tightness of twist controlled by setting of collar behind spring
Fig. 7	Removing broken stud or tap	Saves time and material; reduces scrap	Nut welded on tool, or stud, broken off in casting or fabricated part. Nut same size as broken piece is filled with welded metal to make a solid unit. Flux from welding rod prevents "freezing" to casting surface. Successful in removing taps as small as 4-40. Practicability depends on cost of casting.
Fig. 8	Drilling a square hole	Saves time. More accurate drilling.	Work placed under cylindrical guide with square hole in top. Hole bored through piece, triangular cutting tool then used to follow contour of square guide. Drill press or lathe used to rotate special chuck
Fig. 9 Fig. 10	Drilling or reaming brick, glass, transite and other non-metallic materials	Reduces drilling time. Holes more true to size; increases tool life	Tools (drill, reamer, counterbore, scraper) have tungsten carbide tips cemented on in controlled atmosphere furnace. Care must be taken to prevent point from breaking off. Tools used in conventional manner.
Fig. 11	Cutting smooth surfaces	Eliminates gaskets; tapped surface effect with less time	One cutter tooth extends 020" to 030" beyond other teeth. Tooth cuts along entire edge and literally shaves the metal. But thickness or amount of feed is a few thousandths, depending on cutter speed and area of surface. Cutter bearing must be rigid to prevent work from vibrating.
Fig. 12	Measuring viscosity	Quick, fairly accurate method of making viscosity control tests	Funnel-shaped cut of fixed weight and orifice is dropped into liquid whose viscosity is to be compared with a standard. Time in seconds for liquid to flow up through orifice until the level reaches a pin inside the cup is taken as a measurment of viscosity.
Fig. 13	Twisting stranded wire leads prior to soldering	Speeds production. Uniform twist	Attachment on shaft of ⅛ to $\frac{1}{12}$ hp motor has grooved jaws to hold wire. These are normally closed by a spring and are opened by a foot treadle. Motor speed is 1725 rpm. Production: 400 lead-ends per hour.
Fig. 14	Reclaiming worn boring bar pilots	Repair job quick and economical, long service facilitates operation	Four pads of hard facing electrodes arc welded to worn pilots. Deposit ground to required diameter. Low portions between welds provide clearance for chip removal and aids operation. Useful when diameter of the pilot was sufficient to allow for the necessary machining to accommodate the hardened bushing without interfering with the set-screw.







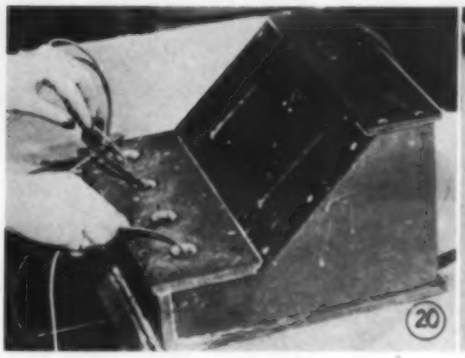
sired depth is then resumed. The solid core formed inside the tubular drill is removed from the part by flexing until it breaks off at the base. Fig. 23 shows such samples mounted both diametrically and longitudinally in plastic (lucite or moldarta), then ground and polished for examination.

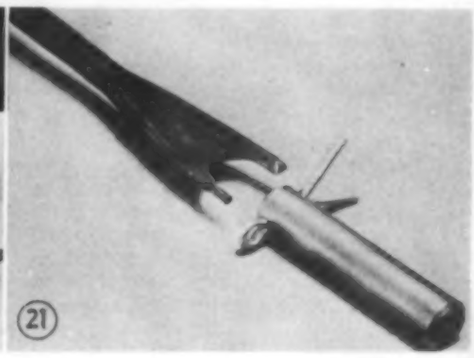
Stamping production is doubled and rejects are cut down considerably in punch press operation by the simple expedient of blowing air down through a ¼-inch hole in the upper die. The air causes the stamped part to rise with the upper die. When the air is shut off, the stamping falls into the operator's hand, thus eliminating scratches and the necessity of prying the work loose from the lower die.

The innovation is used on a press stamping pieces of aluminum as thick as ¼-inch where formerly it was difficult to eject the stamped pieces without harming the finish and slowing production. Usual methods of ejection could not be used, for the vacuum cups proved quite impractical.

The solution was found in the application of the inverse relation of air pressure to velocity. The principle can be demonstrated by placing over the end of a spool a cardboard disk with a pin through it to prevent slide-slip. No amount of blowing through the other end can blow the cardboard away from the spool even when hung below the spool where gravity would seem to make it drop. Air leaving the spool end at high velocity strikes the disk and escapes between it and the spool. This escaping air must overcome inertia and friction, and this causes a reduced air pressure on the spool side of the disk. Result is a balance of atmospheric pressure against gravity such that the disk "floats" close to the end of the spool.

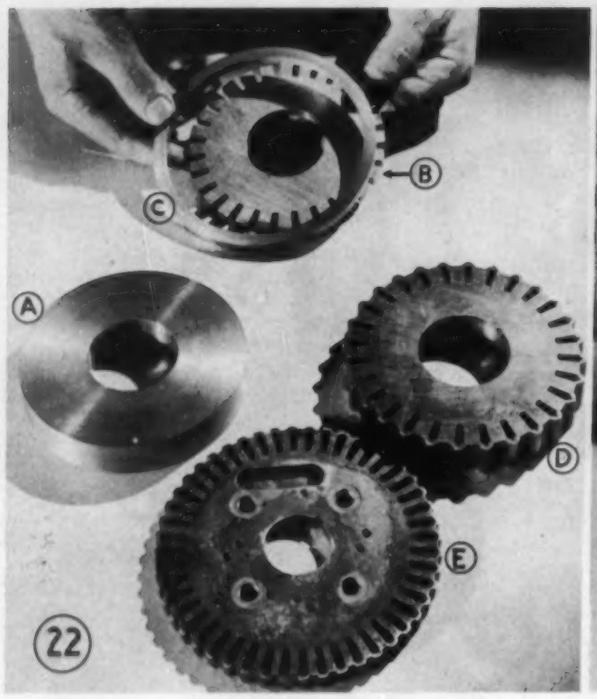
This same idea is applied to removing the stampings. An 80-pound air line is connected to the press to blow air through a ¼-inch orifice drilled in the upper die. Air pressure is applied at the start of the





Seventeen Ways To Speed Production (Cont'd.)

Fig. 15	Preserving life of emery discs	Doubles life of emery discs	Machine consisting of turntable, cutter and centering pin cuts about one inch from outside edge of emery disc. Disc cleaned with naphtha to remove grit and allow emery to cut with efficiency of new disc. A punch press can also be used
Fig. 16	Welding and brazing shunts	Cuts cost and labor; eliminates drilling and bolting	Shunt welded or brazed directly to current carrying part. Flexible stranded shunts of copper wire, of the order of .008 inch can be welded without flux; otherwise, phos-copper flux is used. Welding machine used has automatic timer and an air cylinder
Fig. 17	Preventing solder-iron from burning out	Increases life of solder-iron maintains correct temperature	When not in use, tip of iron remains in housing. Thermostat control in housing disconnects iron when it begins to overheat. Stand developed to hold iron when not in use is plugged into stand. Tip of iron fits into a housing. Thermostat in housing shuts off iron when overheating occurs. Holder used in two sizes for less than 1 inch and from 1 to 1⅝ inch.
Fig. 18	Attaching plastic trim to metal parts	Economical and secure assembly	Operates similar to hydraulic molding press. (1) heated plate carrying coils. (2) removable fixture which clamps plastic to metal. (3) air cylinder raises parts against heated plate. (4) space heaters. (5) thermostat control. Fixture exerts pressure of 50 lbs. on each stud at 285° F. From 15 to 20 seconds required to heat and form plastic stud properly to form and rivet head. Stud formed on plastic piece during molding
Fig. 19	Connecting pipe	Eliminates threading. Saves time.	Malleable iron sleeve fits over pipe ends. Nuts on each end, when tightened, compress a rubber gasket around end of each pipe. Stands pressure of 150 pounds per inch. Handles oil, gas, air heater, water and other fluids
Fig. 20	Testing electrical circuits	Speeds testing 30 per cent cuts operating costs 30 per cent	Unstripped circuit wire dipped in mercury wells or electrolytic salt solution in contact with wells conducts current for testing short and open circuits
Fig. 21	Opening cotter pins	Saves time; speeds production	End resembling screw driver blade is cut out leaving two prongs. One prong is rounded to fit eye of cotter pin; other prong flattened to facilitate opening of pin. Heat treated tool steel used



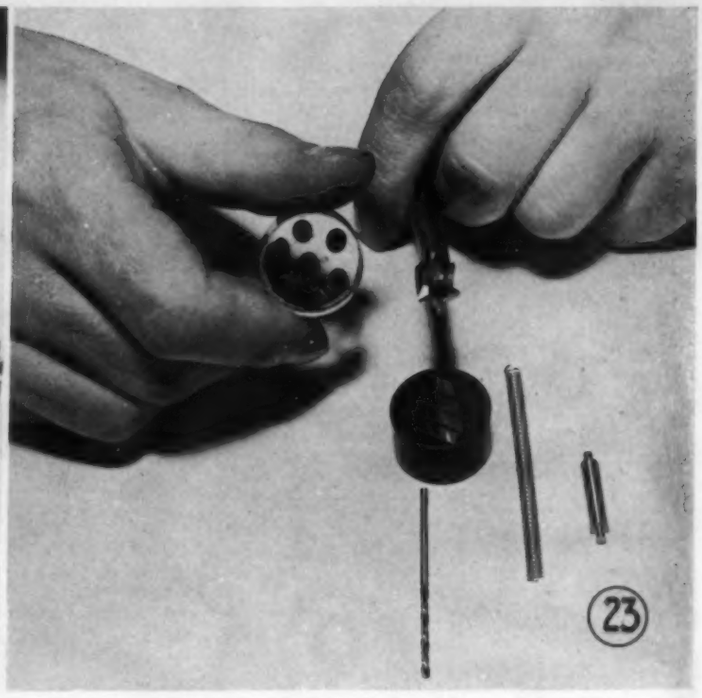


Fig. 22—Milling and brazing technique cuts die costs to only 1/3 to 1/15 of former costs

Fig. 23—Hollow drill saves time in cutting test specimens, enables most parts to be sampled without weakening them, preserves surface of material for inspection

upstroke by a valve connected to the crankshaft. As the upper die rises, the stamping rises with it because of the reduced atmospheric pressure above the piece. At top of stroke, air is cut off and the piece drops into the operator's hands for quick removal.

Fig. 3 illustrates a setup for demonstrating a development that detects sub-surface flaws in heat-treated parts such as bearing races and similar cylindrical objects. It employs a simple magnetic method that works with speed and accuracy *yet does not contact the inspected part*, thus marring or denting highly polished surfaces is avoided.

When a symmetrical piece of steel is properly heat treated and then magnetized, the external magnetic field is uniform. However, any defect in the heat treatment such as a hard or soft spot changes the permeability of the faulty region and the resulting magnetic pattern.

In actual testing, the heat-treated part is first demagnetized completely to wipe out all traces of residual magnetism. Next the piece is rotated while being strongly magnetized so the flux extends outward from the surface being tested. This flux is explored by a pickup coil in which is induced a voltage that is amplified and indicated by an oscilloscope shown at the left in Fig. 3. The pickup is shown below the rotating part which is being magnetized by the powerful permanent magnet held in the operator's hand.

The sweep circuit of the cathode-ray tube in the oscilloscope is synchronized with the rotation of the test piece. The result is that a uniform trace is produced on the oscilloscope screen, with faults showing up as dips. Twelve index points on the screen correspond to points 30 degrees apart on the circumference of the sample being tested. This allows any fault to be quickly spotted on the periphery within a few degrees of its location.

While the setup in Fig. 3 affords only a visual indication, it is possible to add a relay system to produce an audible signal. Likewise, the system could be set to operate automatic machinery for segregating defective pieces coming from a production line.

Provides Trucks with Storage Battery Power

Going "all out" in its effort to co-operate with the government and industry in moving swiftly and safely the rapidly mounting volume of war materials and machines, Clark Tructractor Division, Clark Equipment Co., Battle Creek, Mich., makers of gas-powered industrial trucks and tractors, is now providing the vehicles with full electric equipment for storage battery power where electric operation seems best fitted to the job.

The machines lift from 2000 to 7000 pounds, using a hydraulic vane type pump driven by a special series-wound motor. The same pump operates the tilting unit, which enables the operator to tilt the load back 10 degrees in 5 seconds for safe riding, and tilt it forward 3 degrees in 1 second for tiering.

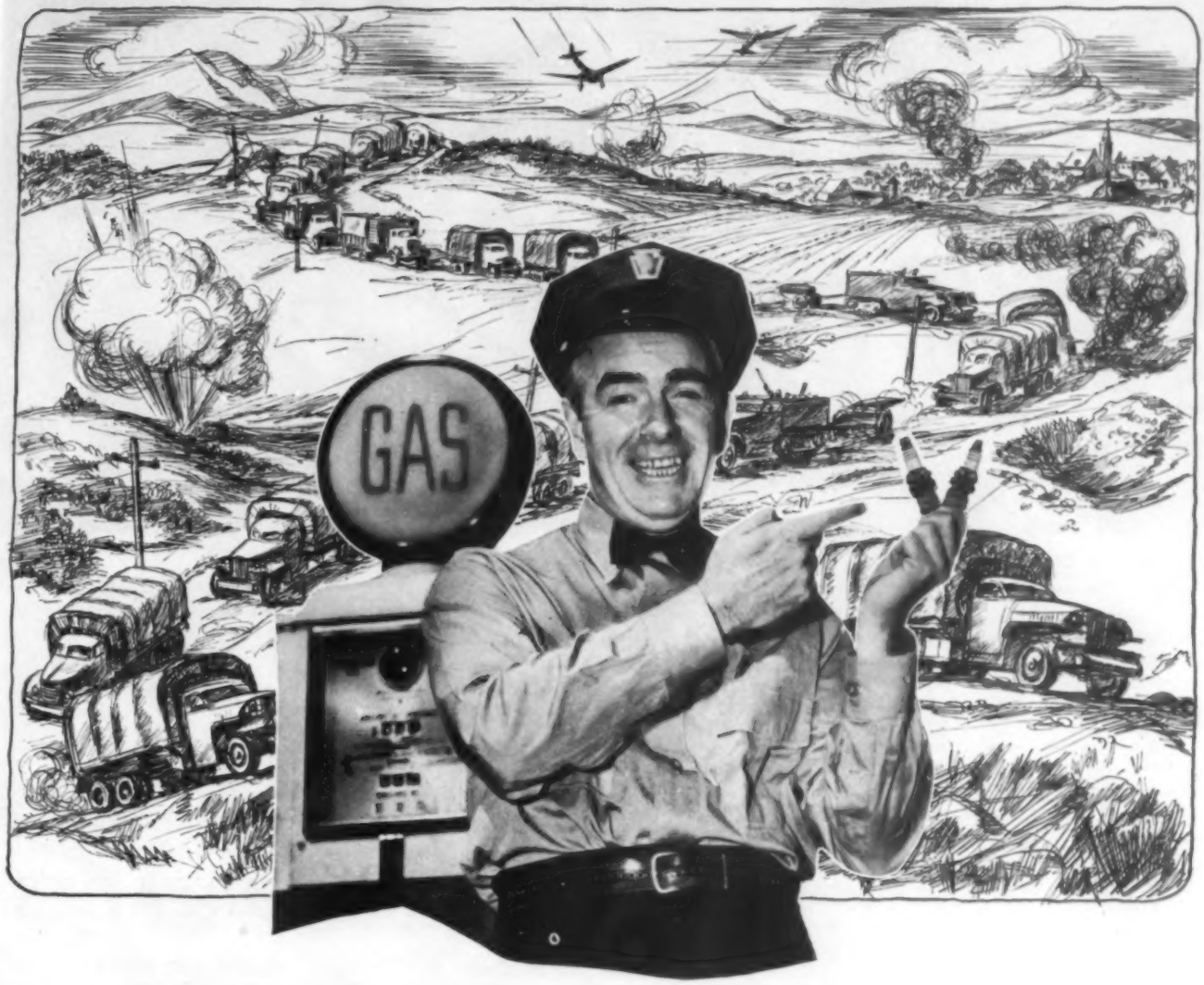
The trucks feature four speeds forward and four in reverse, with speeds up to 6 miles per hour under full load.

In addition, trucks will climb 7½ per cent grades under their maximum loads. A General Electric drive motor mounted directly to the axle drives each unit through a ring gear and pinion.

New Angle Meter Quickens Pipe Bending

A new model angle meter which facilitates making of pipe bends up to 126 degrees and Y layouts is reported by Interstate Sales Co., 1123 Broadway, New York. It has the following features: Extends the range of angles of bend up to 126 degrees; enables laying out of bends and Y's directly on pipe, sheet metal, etc., and also for multi-piece bends; requires no calculations; available flat or folded for field use.

Overall size of angle meter is 12 x 12 inches. It is printed in 3 colors.



The spark plugs Eddie doesn't sell will help smash the Axis

"You know how it is when a spark plug in your car stops firing? Seems to drain all the power from your engine. It's the same way in an airplane or tank. And for each plug in your engine a bomber has a dozen. By taking good care of my customers' plugs I not only save them gasoline and money, but I also save a lot of plugs for use on Schicklgruber."

When Uncle Sam stopped the manufacture of cars for general use, he did more than change the greatest automobile plants in the world into arsenals for tanks and planes. He also released the giant facilities of the spark plug manufacturers for the making of war materials. But in giving these firms new things to make and new alloys to make them of, he handed them new problems with every sheaf of blueprints.

In cooperation with the Revere Technical Advisory staff, leading spark plug manufacturers made the conversion smoothly with a minimum of headaches. For Revere not only supplies industry with sound copper alloys, produced with the help of the most exquisitely accurate instruments known to metallurgy, but also provides skilled assistance in the methods of processing and fabricating.

Copper is one of the most vital of all war materials. Every ounce goes directly into the essentials of modern warfare. Fortunately, Revere is well equipped, with modern plants, improved machines and advanced techniques, to supply a substantial part of our nation's mounting needs. And Revere research is continually exploring new frontiers in copper alloys to provide us all with stouter, keener, swifter tools for victory.

The Revere Technical Advisory Service functions in (1) developing new and better Revere materials to meet active or anticipated demands; (2) supplying specific and detailed knowledge of the properties of engineering and construction materials; (3) continuously observing developments of science and engineering for their utilization in production methods and equipment; (4) helping industrial executives make use of data thus developed. This service is available to you, free.

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

EXECUTIVE OFFICES: 230 PARK AVENUE, NEW YORK

Fig. 1—A tension roll for a tin plate mill is mounted on a lathe for hardening by the band progressive method. A 4-inch wide flame hardening tip is used requiring 11 circumferential turns to harden the 42-inch long surface. Hardness is raised from 30 to 95 scleroscope. Wheeling Steel Corp. photo

Fig. 2—Small gears and clutch parts are spun at 100 revolutions per minute for 8 to 10 seconds under the flames, then removed with tongs and quenched in oil. SAE 5150 steel is hardened to 78 scleroscope, then drawn at 500 degrees to 68 scleroscope

FLAME HARDENING CYLINDRICAL SURFACES

By STEPHEN SMITH
Flame Hardening Specialist
Air Reduction Sales Co.
New York

WAR PRODUCTION has greatly stimulated new and broader applications of flame hardening. In many hardening jobs the characteristics and advantages of the flame process have made it the most suitable solution to the pecular problems arising from the war situation. Much of the increased attention to flame hardening has come about because of expanding ordnance demands for steel parts capable of resisting batter or wear in military service.

More important than this is the fact that the flame process is effective in hardening plain carbon steels, producing wear resisting surfaces previously obtained by the use of alloy steels. Other methods of hardening are likely to affect core ductility unless alloy steels are used, and as such alloys have become difficult if not impossible to obtain for many purposes, the commoner steels must frequently be used for parts requiring high hardness. This offers no obstacle, for even the 0.30 to 0.35 per cent carbon steels can be brought to satisfactory surface hardness with the flame process.

Unlike furnace hardening, in which the entire piece must be heated to hardening temperature, the flame process permits localized treatment of only that portion of the surface where high hardness is desired, leaving the base metal unaffected and causing no change in composition of the hardened sections. Both the degree and the depth of hardness may be closely controlled, and the transitional zone between the hardened and unhardened areas is characteristically gradual.

Distortion, a frequent consequence of furnace hardening, is virtually eliminated since the heat of the flame need not penetrate more than a relatively shallow depth. Too, the entire heating and hardening operation may be confined to a small portion of the piece. The flexibility of application and operation are characteristic of all flame processes. Since the hardening is done on finished surfaces, considerable savings in machining time also are possible.

There are numerous variations in technique which may be devised for hardening round or cylindrical surfaces. Generally the method used for flat surfaces is simple enough and requires little special apparatus.

(Please turn to Page 82)

From a paper presented before the York, Pa., chapter of the American Welding Society, October, 1941.

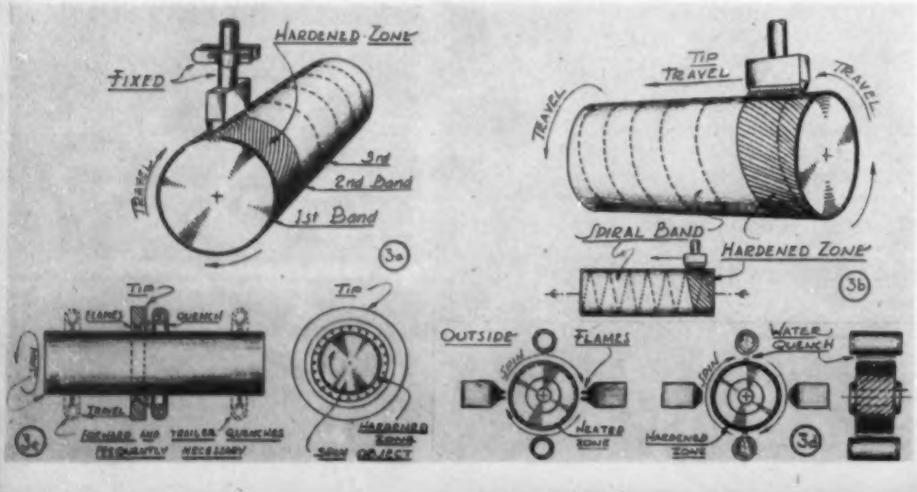


Fig. 3—These four diagrams illustrate the four techniques for flame hardening cylindricel . surfaces. Slow - rotation progressive methods, **3a** and **3b**, are generally used for large diameter objects, while the spinning methods, **3c** and **3d**, are better adapted for handling production work. The four techniques are known as progressive circular-band hardening, **3a**; progressive spiral-band hardening, **3b**; band spinning, **3c**; and progressive spinning, **3d**

WANTED

50 PRODUCTION EXECUTIVES

Must be top-flight men of proven ability, capable of directing the many divisional operations of one of the world's largest aircraft-engine plants.

The Dodge Chicago Plant, division of Chrysler Corporation, now being built in the Chicago area, wishes to have associated with it a large group of men who have demonstrated their specialized talent, executive ability and high character.

The contract held by Chrysler Corporation for the production of aircraft engines is an outstanding commitment in the war program. It requires doing another high-precision job on a mass-production basis.

This gigantic plant will be one of the world's largest under one roof. Machine tools, equipment and facilities will be the finest and most modern. The personnel must measure up to the same high level of individual efficiency.

This war project demands executive supervision of men, materials and machinery on a scale heretofore unknown in industry. The Dodge Chicago Plant, division of Chrysler Corporation, is determined, therefore, to select as executives men who can guarantee the performance required by patriotic necessity and exacting manufacturing standards.

The Production Executives chosen for this painstaking task must be experts, backed by years of proven skill—both technical and managerial. Thousands of able Americans will work under their direction in round-the-clock shifts. Thousands of precision instruments and production tools will be the responsibility of these top men. That is why they all must be exceptionally good!

EXECUTIVES WANTED FOR THE FOLLOWING DIVISIONS—

ALUMINUM FOUNDRY
MAGNESIUM FOUNDRY
FORGE
HEAT TREATING & PLATING

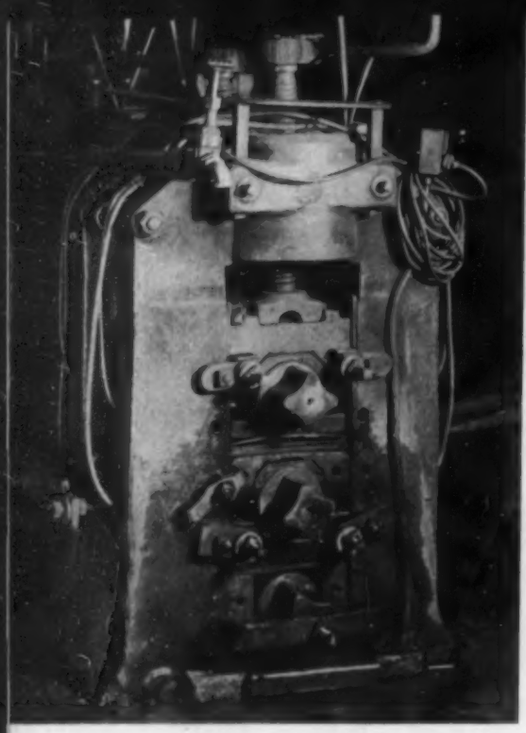
MACHINE SHOP:
Crankcase · Crankshaft
Connecting Rod & Piston
Cylinder Head & Barrel Assembly
Gear Cutting · Precision Parts

ASSEMBLY & RE-ASSEMBLY
INSPECTION
WORKS ENGINEERING
MASTER MECHANICS

NOTE: *Here is an unusual opportunity for men who are eager to become affiliated with a large organization engaged in the production of vital war materials. Give age, qualifications and salary expected. Proof of citizenship required. All correspondence will be kept confidential. Appointments will be made for personal interviews at your convenience. Address your application to Box 729, care of this paper.*

DODGE CHICAGO PLANT

Division of CHRYSLER CORPORATION



Nine-inch bar mill for rolling high-carbon, stainless and valve steels. Composition bearings are water lubricated through 5/16-inch tubes through housings

NONMETALLIC BEARINGS

For Steel Mill Service

By FRANK W. VOGT

Eastern Sales Manager
Ryertex Division
Joseph T. Ryerson & Son Inc.
Jersey City, N. J.

BLOCKS OF laminated bakelite were tried out on small merchant and rod mill stands about 10 years ago. Since then the type of bakelite resins as well as the kind of cotton fabrics that are used to give strength to resist shocks and impact have constantly been improved. Better wearing properties are made possible today by use of various mineral fillers by virtue of the fact that they constantly polish the roll neck while in operation. Manufacturing technique provides the uniformity of material in each stage of its manufacture, which is necessary if a product is going to be depended upon to do a certain job. In the early days this quality frequently was uncertain. Today, however, special coating and drying equipment is used in molding these bearings.

Bakelite and cotton are now, as then, the main constituents of composition bearings. Molds are used to produce bearings of all shapes and sizes. Typical old brass designs are duplicated, thus permitting installations in small mills without installation expense. Liners and separate thrust collars designed to fit large mill chucks are machined accurately to take loads frequently greater than 2 tons per square inch of bearing surface.

Water only in most cases is used as a lubricant. Oil or grease, however, is used successfully on installations such as pinions, slippers (or pressure pads) for universal couplings, table rolls, feed rolls, etc. In fields outside the steel industry, oil is extensively used on composition bearings. Some examples are gyratory rock crushers, rubber mills, and paper mill dryer drums. The combination of grease and water has advantages on many mills, the details of which might be summed up briefly.

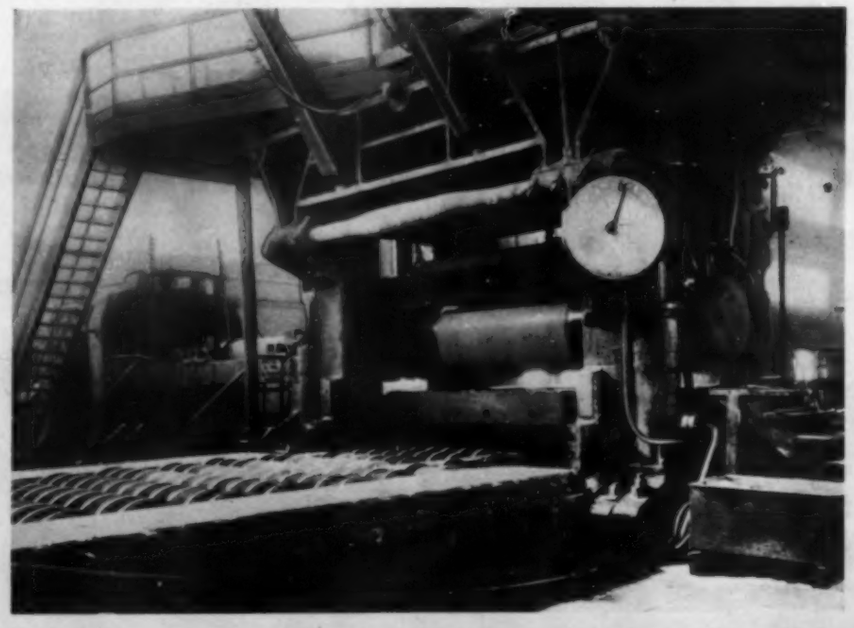
The right kind of grease is important. Some greases actually increase the friction while others help to reduce the power required. The best results have been obtained when water is used with the type of grease generally known as "tallow base". Some greases carry graphite to the extent of approximately 5 per cent but there still remains a question in the minds of many mill men as to the actual value of this ingredient.

Some large steel companies first started using these bearings because the mill motors were underpowered for the increased modern rolling requirement; others because of the need for more uniform section of product to meet competitive demands; others because of the difficulty to properly lubricate metallic bearings; and still others because antifriction bearing maintenance costs had become excessive.

Recently another stimulus to extending the use of composition bearings has developed. With many metallic bearing materials on the list of restricted metals some concerns are making a determined effort to change over to water lubricated bearings wherever possible.

Engineering departments are being brought into this picture more and more as operating departments request composition bearings on new equipment. Recently two new alloy merchant mills were ordered by two eastern concerns. Both of these are being equipped with Ryertex as well as two remodeled plate mills. A large 4-high plate mill also is being built with scale breaker and broadside stands equipped with composition bearings. In designing rolls for use on composition bearings, engineers and roll men find the roll necks can be made larger. For heavy duty mills this is a distinct advantage as the rolls can be made much stronger and thus roll breakage is reduced.

As more experience is being gained in operating these bearings it becomes easier to suggest workable ideas as to practical arrangements of scale guards, water guards, wipers and other devices that are needed on many installations. Scale guards are necessary on plate mills, blooming mills and other large stands. Different types of guards are used depending on whether "hot



One hundred and sixty-inch 3-high plate mill with top roll operating in composition bearing. Power consumption was reduced 17 per cent per ton of rolled product with this type bearing

McKee-Built Plants are BREAKING PRODUCTION RECORDS

JANUARY

Blast Furnace at [redacted] broke all previous world's records for one month's pig iron production with

41,782 TONS

MARCH

Blast Furnace at [redacted] set a new world's record with production of

43,478 TONS

MAY

Blast Furnace at [redacted] produced

43,866 TONS

A NEW WORLD'S RECORD

DURING the past 6 months three blast furnaces, designed and built by Arthur G. McKee & Company (censorship prevents disclosure of names and locations) have *broken all previous world's records* for pig iron production.

These results are definite evidence of the performance obtained from advanced engineering and skilled construction combined with efficient operation.

We are proud of the part McKee has played in providing the facilities with which the Iron and Steel Industry is waging the battle of production.

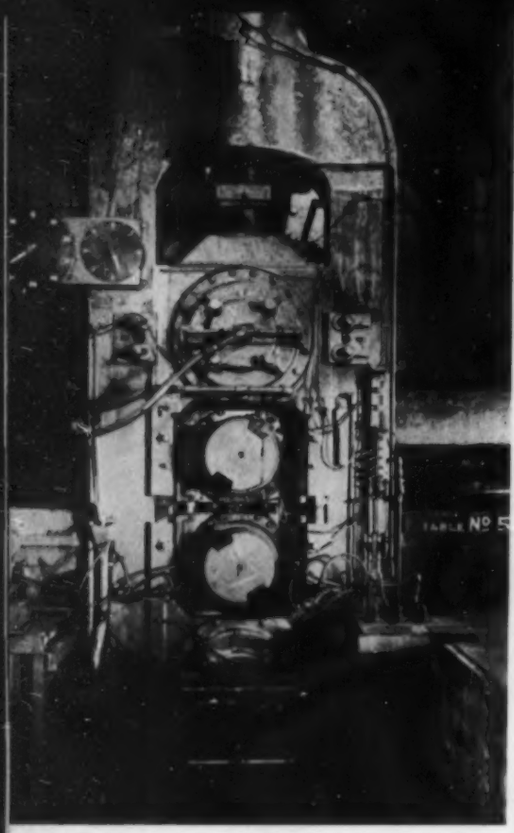
Arthur G. McKee & Company

★ *Engineers and Contractors* ★

2300 CHESTER AVENUE • CLEVELAND, OHIO

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.

COMMERCE BUILDING • HOUSTON, TEXAS



Four-high broadside stand of 80-inch continuous hot strip mill with backup rolls equipped with totally enclosed composition bearings

tops" are to be contended with or only the usual large quantities of heavy mill scale. Water guards have been developed that effectively keep water off dry rolling stands in the steel and brass mills. Pinion stands are equipped with still a different kind of guard that is easy to install on open-type housings.

Greases of various kinds have been tried on large reversing mills and small cold mills. This type of lubrication here seems to help, as in both cases it is necessary to start the mill under load. The starting torque under load without grease is high, but normal when a small amount of the right kind of grease is used. Too much grease frequently is worse than not enough, which principle also holds for many metallic bearings.

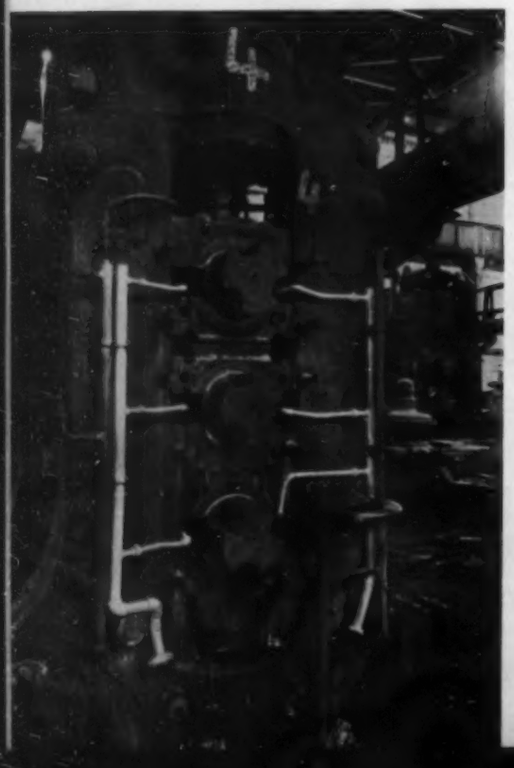
In the early stages of the introduction of composition bearings all sorts of things were encountered, such as thrust collar troubles, too tight end-screws, not enough water, water in wrong place, bad roll necks, etc., any one of which was in itself enough to call the job off temporarily.

By now, however, most users either have been helped out of their difficulties or found their way out by themselves. These experiences have been catalogued into a set of rules and a booklet on "How to Install and Operate Composition Bearings", has been printed for the express purpose of keeping new users out of trouble on their initial application of these products.

The foregoing problems are constantly being discussed in meetings of rolling mill men and in every day conversation between sales engineers and operating men. They usually are found to resolve themselves into simple matters that can be dealt with once the operating conditions and limitations of the material are understood by both parties.

To illustrate this point a case of a short bearing life is sighted. A large mill had been equipped with composition bearings for several months when the bottom roll bearing life dropped to one-tenth of what used to be considered normal. The bearing liners were checked by the factory and found to be up to standard. Further investigation revealed that the bottom of the bearing seat was not flat but was high in the center. This caused the chuck to spread and in the meantime the bearing was subjected to loads of perhaps 15,000 to 20,000 pounds per square inch instead of 3000 to 4000 pounds. The seat was machined flat and bearing life returned to normal.

A word of explanation should be added in an effort to clear up any question that might be raised to statements made in advertising literature about composition bearings lasting two to ten times as long as metallic bearings, or in exceptional cases as high as 100 times. While these statements always have a true story back of them it is not always given in detail. For example, a continuous rod mill bearing was found to last over 100 times as long as babbitt. This was on the finishing end of the mill. The real explanation is that when babbitt was used with grease for lubrication the bearing never could be properly lubricated because the water kept washing off the grease. Obviously this was a case of "poor lubrication" but it was the best that could be expected under the circumstances. By changing over to a bearing that required water only for lubrication and with the water easy to apply continuously at the right place the conditions were radically changed. It is no wonder that the new type bearing lasted 100 times as long.



Twenty-three-inch 3-high structural and rail mill completely equipped with composition bearings with an average power saving of over 28 per cent

Many jobs in steel and brass mills now are difficult to lubricate with grease or oil and where water can be used without any trouble. These are the first places to look for in extending the use of composition bearings. These places may be large users of power. Many installations in positions like this show savings of 50 per cent and more, simply because the fundamental operating conditions are changed. No brass or babbitt bearings operate at their best with water for lubrication under heavy rolling mill loads.

A summary of power saving expectations on various type mills are given herewith so that 50 per cent reductions will not be taken as a figure for all mills changed over to composition bearings:—

Steel Mills	Per cent
Blooming mills (reversing)	10
Continuous billet and bar mills	
Roughing stands	10
Intermediate stands	20
Finishing stands	30
Merchant Mills	
(Belgium, cross country)	25
Plate mills (3 high)	35
Sheet mills (3-high roughing)	25
Sheet mills (2-high skin pass)	50
Cold strip mills (2-high)	20
Brass Mills	
Breakdown stands (hot)	20
Breakdown stands (cold)	20
Running down (cold)	30
Finishing stands (cold)	30

Mill owners and operators are becoming more familiar with two important factors:

1—Composition bearings have been installed in and are being used daily on a large number of both old and modern mills.

2—The records of operating costs conclusively show that large savings are being made through (a) power saving, (b) longer bearing life, (c) better section, (d) less down time.

AFTER THE WAR-- NO DEPRESSION

We look down the road and plan for the dawn of that better day when peacetime needs will once more be the first line activity of American industry and labor. It is evident that the enormous capacity of our new plants and modern equipment will permit America, for the first time, to make enough of all kinds of goods to go around to *all* our people.

Post-war costs can be very low because these new factories will be "charged off" by the time the war is over. Furthermore, craftsmanship is on the increase and working with the hand is no longer looked down upon. A vast reservoir of new and improved products will be ready to flow to every corner of the land if the profit motive and the American enterprise system prevail. We cannot tolerate another prolonged depression, interference with business or an economy of scarcity.

There are two schools of thought that are advocating methods of continuously spreading our production among our people. Under one plan, certain academic thinkers would limit production, would subsidize the incompetent plant, the national debt would continue to mount and the profit motive would be stifled. Our capitalistic system and democratic processes could not long endure under such a plan.

Another school of thought favors unrestricted free enterprise, elimination of monopolies, corrections of restraints caused by patents, cessation of uneconomic deterrence by unions, a tax program that would encourage new enterprise and a free competitive productive economy.

Business management is putting its house in order for post-war productivity that will be possible if the "doers" and not the politicians predominate in planning.

★ ★ ★ ★

For peace adaptability, the new process known as Contour Sawing is ideal. Without a single change, each DoAll can be put to work catching up on the vast array of civilian goods that will be in demand as soon as the last shot is fired.

DoAll WINS THE BATTLE OF PRODUCTION

DoAll saved 18 hours on this job. Production cutoff of angle irons. Former method, torch and grind-off burr.

● Out of the great American caldron they come in ever-increasing quantities—tanks, planes, jeeps, helmets, guns, bullets.

Behind the allied fighting forces stretch miles of production lines, thousands of modern machine tools, millions of workers on the job 24 hours a day.

Wherever you go you'll find DoAll, the lightweight machine tool that saws through any metal or alloy—steel blocks a foot thick, bars, flats, sheets, tubing, etc. Occupies small space—can be shoved into the regular work line to relieve heavy millers and higher priced shapers of over-load work. Cuts out special parts and tools without dies. Saws 70 to 80 shapes at one time from stacked sheets.

DoAll is the fastest precision method to remove metal. Does a week's work in a day—a day's work in an hour—an hour's work in 15 minutes.

Flexing Bars for Dynamometers. Production cutting from 1" Swedish steel.

Cutting openings in 12 gauge 48" steel tank covers.

IN WAR OR PEACE

DoAll can save you valuable time and money. Let a factory-trained man come to your plant and in a few minutes, show you many ways in which DoAll can increase your production.

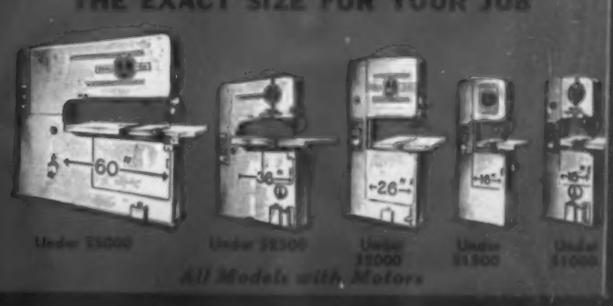
NEW BOOK

Case histories of DoAll performance. Photographically told, with short sentences, for busy executives. Send for copy.

CONTINENTAL MACHINES, INC.
1324 S. Washington Ave.
MINNEAPOLIS, MINN.

Associated with the DoAll Company, DesPlaines, Ill., Manufacturers of Band Saws and Band Files for DoAll Contour Machines

THE EXACT SIZE FOR YOUR JOB



Flame Hardening

(*Continued from Page* 76)

For hardening round sections there are four general methods which may be used, and refinements to these may be worked out when the quantity of production warrants development of special apparatus.

These four techniques are described as band progressive, spiral band progressive, band spinning and progressive spinning. The method chosen for a particular job depends on the nature of the work and the facilities available. The most uniform hardness is produced by the "spinning" method, which thus is usually the most satisfactory.

Essentially the two "progressive" methods are direct adaptations to circular work of the technique applied in hardening flat surfaces, where the work is moved slowly past the heating flames and quench jets. In the spinning technique, on the other hand, the work is revolved at fairly high speed before the flames, heating entire circumferential areas before they are quenched. The advantage of spinning is that it eliminates overlaps or soft zones. All four methods are applicable to hardening either external or internal cylindrical surfaces, continuously or in localized bands.

Band Progressive Method: Large-diameter cylinders, rolls, shafts and sleeves may be flame hardened by the band progressive method. The work is usually mounted on a lathe or other machine which can be geared to rotate the work at circumferential speeds of from 3 to 10 inches per minute. The heating tip is then mounted on the lathe carriage tool post or similar mount capable of lateral movement parallel to the axis of rotation of the work. The multi-flame tip is water cooled and may have a built-in set of water jets which act as a quench, or be followed closely by a separate quenching stream. Hardening is accomplished by rotating the work past the flames at a peripheral surface speed which may range from 3 inches per minute for a ¼-inch depth of hardness to 6 inches per minute for a 1/16-inch depth. These figures are subject to some variation according to the thickness of the object heated.

Upon completion of one revolution of the circular object the flames are extinguished and the heating tip shifted to a new position for hardening the next adjacent band. A narrow space of ⅛ to ¼-inch should be left between tip positions to allow for heat conduction outside the flame-swept zone. As additional pre-

(*Please turn to Page* 97)

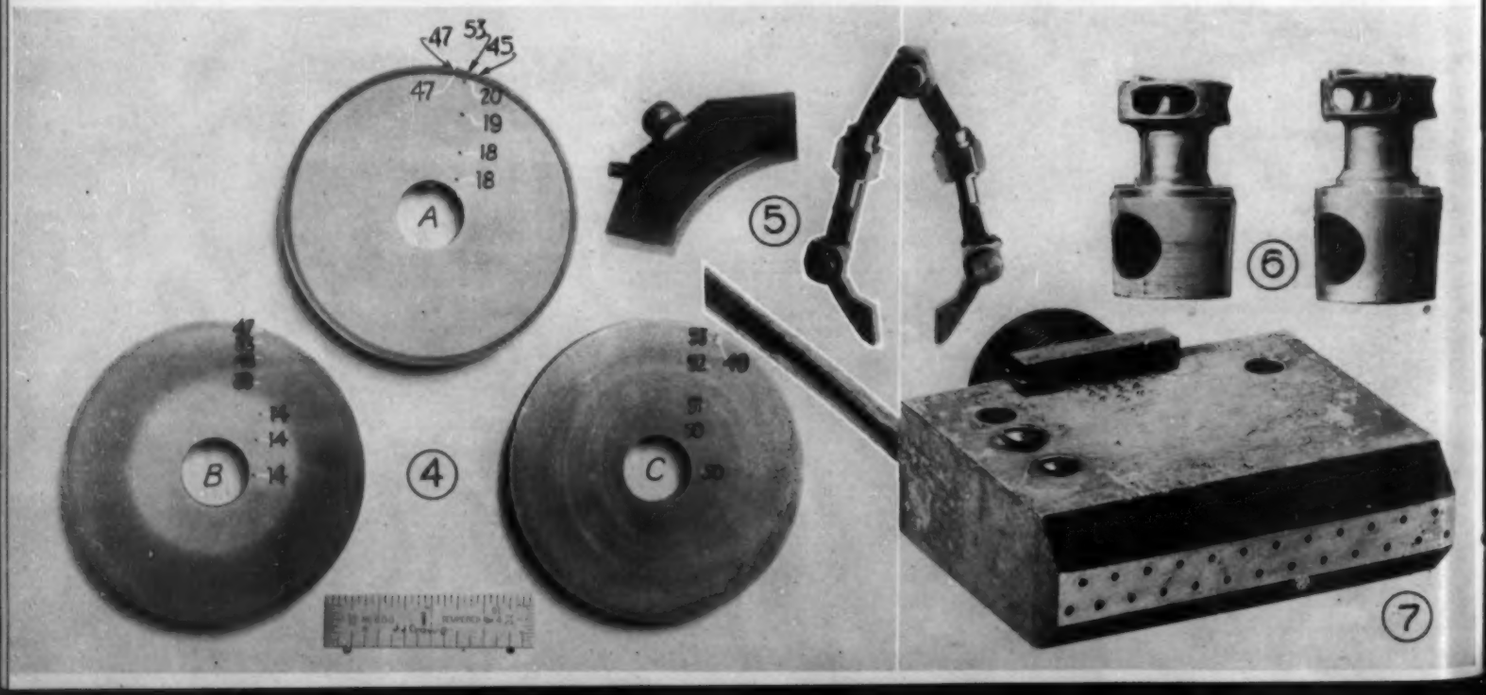
Fig. 8—Progressive band hardening being employed on a 63-inch diameter forged lathe spindle of SAE 1040 steel. Speed of rotation is regulated for hardening to between 400 and 450 brinell and to a depth of ⅛-inch. Westinghouse Electric & Mfg. Co. photo

Fig. 4—Depth of hardening is readily controllable in the spinning method. These shaft sections show hardening all the way through at right, deep hardening at the left, with shallow hardening at the top. Numbers indicate hardness values. Shallow type retains core ductility, so is usually preferred

Fig. 5—Two or more segmental flame-hardening tips form a ring of flames around the work for external hardening by the spinning method. Adjustable tips are shown at the right, designed to handle a variety of work

Fig. 6—Valve plug at left is unhardened, while plug at right has been hardened and is ready for surface grinding. An auxiliary water quench prevents burning of edges of holes during flame hardening. Hamer Oil Tool Co. photo

Fig. 7—A standard flat flame-hardening tip, as wide as practicable, is used in progressive band and spiral methods. These tips are water cooled. For the lighter types of work, they have self-contained quench



TODAY'S *No. 1 Problem* IN WAR PRODUCTION

● During the first days in school, our little boys and girls are earnestly *fitting* pegs and blocks into the holes *where they belong*. It's one of their earliest problems in school life.

Today, in Washington, the nation's key production men are engaged in a grim and all-important version of this same basic problem. Theirs is the gigantic task of *fitting the complicated pegs* of America's industrial and material resources into the largest war production program the world has ever known.

Into this complex problem, The Sisalkraft Co. *has found the places where its products fit.*

For over twenty years The Sisalkraft Co. has led in the development and production of reenforced, waterproof papers. *For over twenty years*, FIBREEN has been wrapping and protecting goods and materials, in transit and in storage.

Today FIBREEN continues to protect huge quantities of war materials of all kinds — *guarding them against damage* from rain, dust, sea water or salt air during long exposure to all kinds of weather — *keeping them in condition for use and action at destination.*

FIBREEN fits—because it's durable, completely waterproof, amazingly strong. It's used as a wrap, as a cover, or as a bag — in almost any size or shape — for planes, tanks and trucks or small arms, medical supplies, delicate instruments and vital repair parts.

It further fits the war program because it is produced many times faster than woven fabrics, with only a small portion of the labor, and at far less cost. In addition, it releases such vital materials as burlap and canvas for other important war needs—*and costs much less.*

Other Sisalkraft papers are also doing their part. They are being used to cure concrete floors in arms plants — or runways of flying fields — and to help build strategic military and access roads—*providing a better cure, with fewer man-hours, and at lower cost.*

And farmers are using Sisalkraft papers to help solve their major problem of storing grains and feeds — and to provide the silos they need so badly.

That's how the entire production of The Sisalkraft Co. today is confined to essential war uses.

If your product fits the war program — if you are concerned about the delivery of your products *in the same excellent usable condition* as they leave your factory—write us and see if FIBREEN is the answer to your problem. *Tell us what you make and how you now pack it.*

THE SISALKRAFT CO.

Manufacturers of Sisalkraft, Fibreen, Sisal-X, Sisaltape and Copper-Armored Sisalkraft

205 W. WACKER DRIVE - CHICAGO, ILL.
New York San Francisco London Sydney

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FIBREEN
EFFECTIVE *Protection* IN TRANSIT-IN STORAGE-FOR EMERGENCY USES

SERVING INDUSTRY, CONSTRUCTION AND AGRICULTURE THROUGHOUT THE WORLD

Fig. 1 (Left)—Pallet loads are stacked two-high in freight car. Note refractory shapes so assembled as to assure minimum shifting of individual bricks, even though of odd shape. Fig. 2 (Right)—Powered fork trucks of compact design are easily maneuvered up and down ramps, through narrow aisles

HANDLING REFRACTORIES

.... with fork trucks and pallets cuts costs, speeds masonry operations

USE OF pallets and fork trucks in handling firebrick for lining open-hearth furnaces is being tried by a number of steel companies in co-operation with refractory manufacturers. Co-operation is essential since the system must be installed first at the plant of the refractory manufacturer before his customer, the steel plant, can obtain any benefit. Advantages include decrease in handling costs and saving of time by both maker and user, expansion of brick-house storage capacity, protection of shapes from damage, and consequent speeding of masonry operations.

One large steel company now receives its firebrick on pallets stowed in box cars. Rough green oak lumber is used in making pallets, 36 x 48 inches in size, at a cost of 28 cents each. Each pallet holds 360 brick, so assembled as to allow minimum shifting of individual bricks.

Pallet loads are stacked two-high in the freight car, 20 in one end and 16 in the other end, the remaining space being reserved to permit the operation of a power truck within the car. Each group of pallet loads is bound with No. 8 wire to form a floating load, a condition assisted by chamfered skids. Kraft paper is laid between individual pallet loads. Four bulkheads of rough green oak timber are used in each car. Bulkheads and pallets are returnable. They are shipped back to the brick plant and are used continuously.

On arrival at the steel mill, the box car is spotted in position to bring the car door opposite to a concrete ramp extending from car floor level to brick-house level. Figs. 1 and 2 show the unloading operation, using a gas-powered fork truck capable of maintaining its rated speed under load and of negotiating ramps and narrow aisles.

Two men unload a car of brick in an hour—one machine operator and one man in the car to straighten loads. This rapid operation releases the freight car quickly for more trips, an especially valuable point in view of the present need for cars. It is expected that perfection of the method, perhaps by steel-strapping individual pallet loads at the brick plant, will enable the machine operator to handle the unloading operation without help.

Fig. 4 shows pallet loads being tiered four-high in the brick house. High tiering, easily accomplished by the power truck, automatically in-

Fig. 3—Bricks, still loaded on their pallets, are placed on intra-plant flat cars for transfer to the furnaces. One operator, or at the most two, easily handle these unloading, storing and reloading operations

TAKE a good look at this gloating scoundrel . . . our evil enemy . . . the Axis. He's smirking, but by conservation, you can help have him scowling in double-quick time . . . As makers of the Exide-Ironclad Batteries used for power in so many material handling operations, we urge regular battery care. Follow these four simple rules and *Save to Win!*

Exide IRONCLAD BATTERIES

MAKING BATTERIES LAST HELPS STOP THE AXIS!

1. Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
2. Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
3. Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.
4. Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Fig. 4—Pallet loads are easily tiered four-high in the brick house as shown here. High tiering greatly increases capacity of the brick house by using "air" space

creases brick-house capacity. Fig. 3 shows withdrawal of brick loads and their deposit on flat car for transfer to the furnaces. Company track extends down the center of the brick house, and the power truck tiers pallet loads two-high on flat car of intra-plant railway from floor level.

Unloading from box car and loading to flat car formerly were accomplished by conveying the brick mechanically to crews who tossed them by hand to other men who piled them in storage or on flat car bed. This method resulted in many broken brick corners. As a consequence, masons on the furnaces were compelled to use damaged brick which were perfect when they arrived at the mill. This slowed brick-laying operations and definitely increased costs needlessly at this point.

Mills experimenting with this method of handling refractories are reluctant to release figures of cost saving, pending improvements in the system. Results recorded to date have demonstrated that the economies possible amply justify an investment in the construction of adequate brick-house floors and unloading ramps.

Similar handling method for refractory material has been developed by engineers at the foundry of Pontiac Motor Division, Pontiac, Mich., where important economies have been reported in handling costs.

Welding Society Offers Book of Welding Terms

Two booklets, one on the definitions of welding terms including a master chart of welding processes, and another on recommended practices for inspection of fusion welding (tentative) are being offered by the American Welding Society, 33 West Thirty-ninth street, New York. Both publications can be obtained from the society's headquarters for 40 cents each.

NE (National Emergency) ALLOY STEEL APPLICATIONS

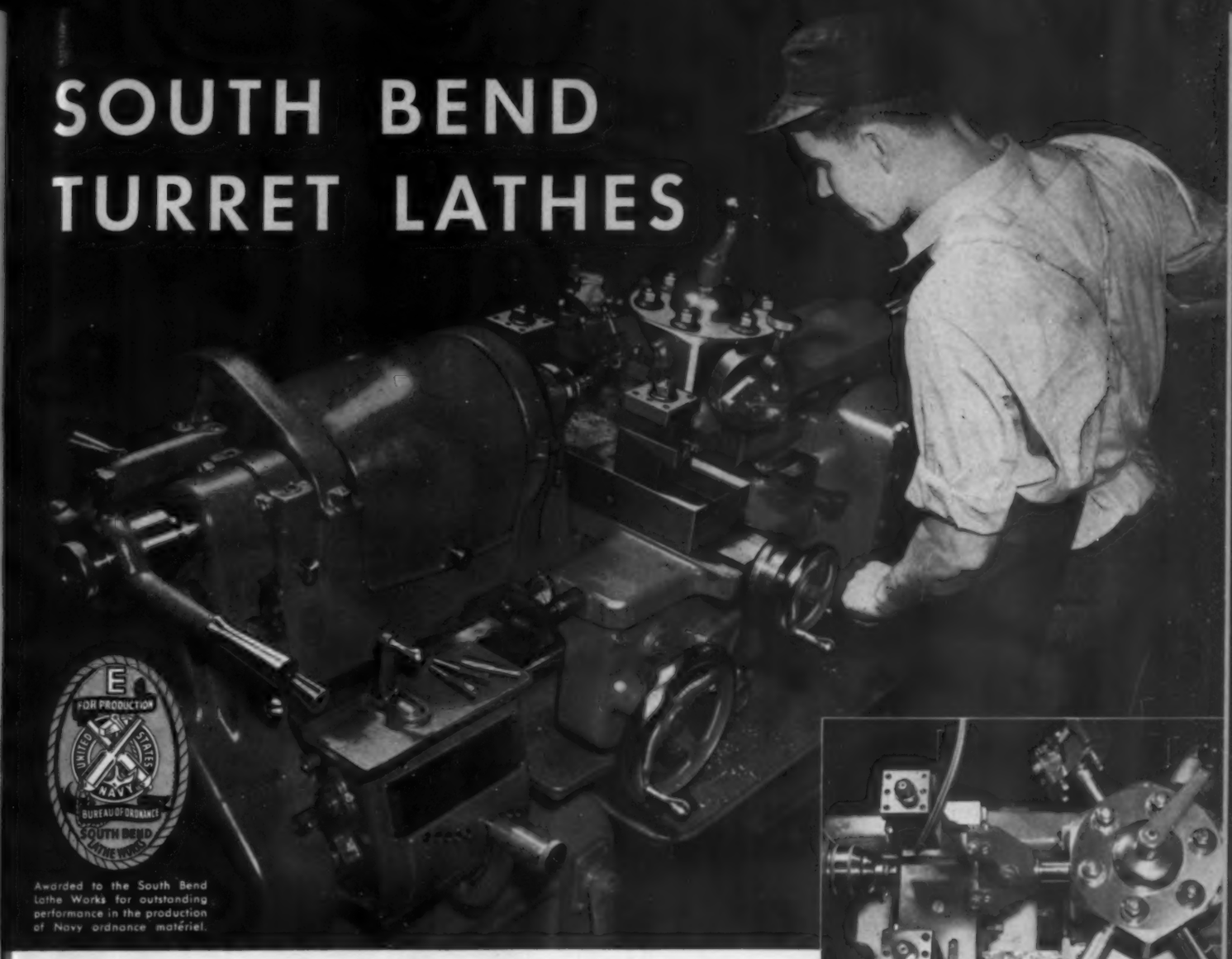
THE NEW NE steels already have been used successfully in a considerable variety of applications, 60 of which are set forth in the accompanying list. This list identifies the NE steels by numbers, together with the numbers of the standard steels they replace in individual applications.

By applying to steel producers and other suppliers, consumers can obtain metallurgists' recommendations as to the best NE steel for a given application and procedure to be followed in working with it.

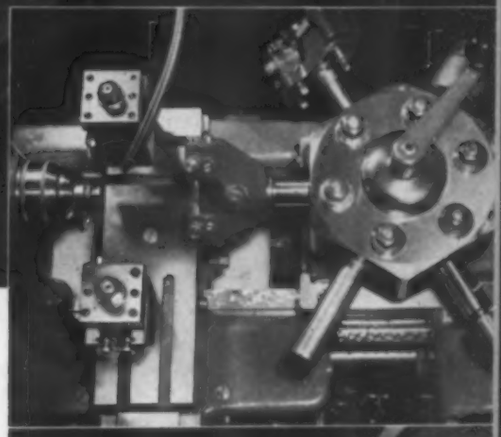
NE Steel Applications

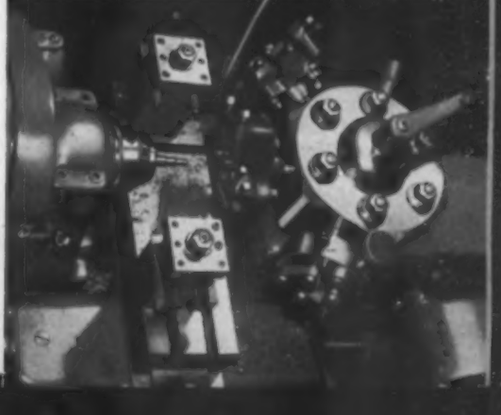
NE Steel	Application	Standard Steel Replaced
8024	Ball studs	3115
	Machine tool shafts	4620
	Steering gear worms	4120
8339	Steering arm studs	3045
	Connecting rod bolts	2340
	Brake adjustment bolts	3140
	Chain links	3140
	Truck gears	4140
8442	Oil well tool joints	3140
	Socket wrenches	4140
	Wrenches	6140
	Chain pins	5150
	Die inserts	4140
	Drill shanks	4140
	Low temperature studs	4142
	Locomotive side rods	Special
	Locomotive piston rods	Special
	Locomotive crank pins	Special
8447	Steering knuckles	3140
	Lever holders	4140
	Tractor shafts and gears	4145
	Truck axles	4150
8547	Gears	4150
8620	Transmission gears	4120
	Air drill parts	2315
	Ring and pinion gears	4620
	Chuck jaws	4615
	Coal cutting chain bushings	4615
	Machine tool gears	2315
	Roller bearing cups and cones	3120
	Transmission spline shafts	3120
	Rear axle drive pinions	4320
	Differential spiders	6120
8630	Steering arms	4130
	Cutter bitt holders and wedges	6135
	Hand tools	4130
8724	Bearing cones	4620
	Tractor gears	4820
	Transmission gears	6120
8739	Bolts	3130
	Mining machinery parts	4137
	Transmission gears	5140
8744	Machine tool parts	3140
	U-bolts	4142
	Tractor gears and shafts	2345
	Set screws (heavy duty)	3145
	Engine bolts and studs	4140
8749	Pins	3250
	Machine tool parts	2350
	Pneumatic tool parts	4640
	Machine tool gears	4150
	Transmission gears	5150
8817	Coal cutting chain straps	4320
	Carburized transmission gears	3115
	Machine tool parts	3115
8949	Axle shafts	3240
	Truck clutch parts	3240
	Gas engine connecting rods	4340
	Milling machine transmission gears	2345
	Oil well machinery parts	3145

SOUTH BEND TURRET LATHES



Awarded to the South Bend Lathe Works for outstanding performance in the production of Navy ordnance matériel.





Productive Versatility

South Bend Turret Lathes have the kind of versatility that speeds production on many classes of work. A wide range of spindle speeds permits maximum cutting tool efficiency. Rapid change from high speeds to low speeds saves time on thread cutting and reaming operations. A quick change gear box provides 48 changes of power feeds for the universal carriage and the turret. The universal carriage has 48 precision thread cutting feeds driven through a lead screw and half-nuts.

Standard extras include compound cross slide, four-way turret tool block, micrometer carriage stop, thread indicator dial and taper attachment. These attachments simplify tooling the lathe for many classes of work, and make it especially adaptable to second operation jobs.

The South Bend No. 2-H Turret Lathe has a chucking capacity of 16¼″ swing over the bed and saddle wings, a spindle bore of 1⅜″ and a collet capacity of 1″ for round stock. Twelve spindle speeds (16 to 880 r. p. m.) are provided. The effective feed of the turret slide is 6⅛″ and the distance from spindle nose to turret is 30½″. Complete specifications are contained in Bulletin 67-T, which will be sent upon request.

SOUTH BEND LATHE WORKS

Dept. 867 South Bend, Indiana, U.S.A.

LATHE BUILDERS FOR 35 YEARS

KEEP YOUR WELDING MACHINES WELDING

By R. F. WYER
Welding Engineer
General Electric Co.
Schenectady, N. Y.

Fig 1. (Directly above) —Hand-operated grease guns should always be used on pressure-relief lubricated bearings. Add grease slowly to permit excess to vent from relief pipe. Fig. 2. (Right) —Sanding brushes to a good fit with the commutator is essential whenever new brushes are installed.

WHILE modern arc welding sets represent the highest in simplicity and reliability, they require periodic attention from a maintenance standpoint if they are to be kept in the best operating condition. With the accent on production in shipyards, ordnance plants, and welding shops of all types, the failure of even a few sets is sometimes costly. A systematized maintenance program will pay dividends in terms of better welder performance and longer life.

Selection: The right welding set must be selected for the job, because a maintenance program will be discouragingly difficult if misfit equipment is being used. To insure proper choice of the rating of a single-operator set, the maximum current, load voltage and duty factor (ratio of arc time to total time) must be taken into account. Except in the smallest sizes, most sets are rated on a one-hour load. Their rating is the current which they will deliver for one hour without interruption, without exceeding a prescribed temperature rise.

Since this method of rating, chosen as a simple standard for comparison, does not take into account actual operating conditions, it is not always economically sound to choose the size next larger than the maximum operating current contemplated. However, for this same reason duty factor should be taken into account when new equipment is being considered to make certain that the set is big enough for the job.

Installation: Proper installation can do much to keep the welding equipment at work and to hold troubles to a minimum. In wiring up a welding set, care should be taken to provide adequate branch circuit conductors, and fuse clips large enough to accommodate the necessary fuses. It should be observed that motor-generator type welding equipment have full-voltage motor starters almost without exception, so that due consideration must be given to the high starting current of the motors.

Care should be taken to ground the frames of all welding equipment in order to avoid shock or annoying tickles when a grounded person touches the frame of the equipment. Even with equipment in perfect operating condition, under some conditions it is possible to receive a harmless but irritating sensation of shock from ungrounded equipment due to the passage of infinitesimal capacity or leakage currents. In addition to protecting against this annoyance, adequate grounding of machine frames is also a desirable safety precaution

then I said to myself—

...and look at the saving in man-hours and materials

Sure, design for cost-saving is always important... but right now design for saving man-hours and materials is vital.

ALTER EGO: Isn't that just what the designers of this trailer chassis did? By changing over to welded design, they've saved 20% in man-hours and 25% in weight of iron and steel, in addition to costs such as shown.

Yes, but how about the man-hours required to change over designs and to convert production to welding?

ALTER EGO: It's simple and quick. Designs can be changed gradually, one part at a time. Production fixtures for the welded parts can be built easily and quickly.

Then, doesn't that account for the industry-wide swing to welding? Everybody sees in this process a means of getting into production quicker and producing faster... to win the war.

ALTER EGO: Not only to win this war but to survive in the Battle for Business after this war. Why shouldn't we start by studying the Lincoln Handbook of Design and Practice and applying some of its suggestions? Everyone says it's the authentic reference guide on arc welding.

"Procedure Handbook of Arc Welding Design and Practice." 1120 pages. 1557 illustrations. Price $1.50 postpaid in U.S.; $2.00 elsewhere.

THE LINCOLN ELECTRIC COMPANY
CLEVELAND, OHIO

ALTER EGO: Literally, "one's other self"—the still, small voice that questions, inspires and corrects our conscious action.

Fig. 3—The "megger" is a convenient instrument for determining the condition of insulation by indicating its resistance to leakage currents. It is a valuable aid in predicting coming trouble

against harm resulting from insulation failure in equipment or leads, or improper connections.

Regardless of the type of safety ground connection which is installed, adequate low resistance work leads should always be used, and care should be taken to secure good connection between the work lead and the work. If this is not done, it is possible under some circumstances to overheat the safety ground connection by the passage of welding current through it.

In the location of welding equipment, ventilation is a very important consideration. The life of electrical insulation is seriously shortened by overheating, and overheating is bound to result where insufficient ventilation is provided. Particularly where large numbers of welding equipment are to be located in small enclosures, considerable study should be given to the problem of supplying clean, cool ventilating air. Where small houses or temporary sheds are located in hot sunshine, the heat absorbed from the sun added to the heat dissipated by the welding equipment may raise the ambient temperature above 100 degrees Fahr. and cause severe overheating.

In such cases, large louvers or other ventilating openings should be provided in the building not only at the bottom but near the roof to give good air circulation and keep the ambient temperature below 100 degrees Fahr. In some instances, it is desirable to provide exhaust fans to assist in removing heated air from the upper part of such enclosures.

Records: The competent maintenance man will have a record of all welders under his care. One of the most useful and easy-to-handle references is a card file. All repair work, with its cost, can be entered on the record, and any welder requiring excessive attention or expense can be investigated and causes determined and corrected.

Inspection records will also serve as a guide to tell when welders should be replaced because of the high cost to keep them in operating condition. Misapplications, abuses, and the like will also be disclosed.

Periodic Inspection: A systematic and periodic inspection of motors and generators is necessary to insure best operation. While some welders are installed where conditions are ideal—where dust, dirt and moisture are not present to an appreciable degree—most machines are located where some sort of dirt accumulates on the windings. This

(Please turn to Page 99)

Fig. 4. (Below)—Blowing dust out of a welding machine should be done carefully with low-pressure air to avoid driving abrasive dust into insulation

Fig. 5. (Right)—Card records on every welding machine in the plant will save time and money. Recordings made after inspection and service indicate any machine requiring excessive expense, the cause then can be corrected before an emergency occurs

Amp.	Speed	Make	Connection Diagram	Application	Shop or Mill No.	Card No.
Type	Motor Voltage		Time or Duty Cycle	F.L. Amp.	Phase	Cycles

Serial No. Model No.	Publication No.	Mfr's Order No. Our Order No. Date of Order Cost
BRUSHES No. Cat. No. Size Material Grade	COILS (Cat. or Spec. No.) Motor: Stator — Main; Comm.; Comp. — Rotor — Coils; Bars; No. per set Generator: Field — Main; Comm.; Comp. — Armature — Coils; Bars; No. per set	
BEARINGS Front End, Cat. No. Motor End, Cat. No.		User: Location:

SERVICE RECORD

Date	Shop	Floor	Service (Tacking, etc)	Duty Factor	Tested Load	
					Volts	Amps

REPAIRS

Date	Condition	Due to	Repaired by	Cost

MAINTENANCE

Greased		Inspected		Cleaned	
Date	By	Date	By	Date	By

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● This powerful Galland-Henning Baling press was developed especially to speed the reclamation of heavy-gauge scrap in sheet mills. It helps to produce a steady flow of compact, high-density, mill-size bales from sheet-mill floor back to the furnaces. It promotes maximum recovery of usable metal, saves time, temperature and metal loss resulting when furnaces are charged with loose, unbaled scrap. One steel mill in particular reports a great saving in charging time, heat and recovery, resulting in higher production, and lower costs. In heavy stamping plants, too, this G-H Mill Type Baler makes scrap-metal salvaging a profitable operation.

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The G-H MILL TYPE BALER

A Heavy-Duty, Triple Compression, Hydraulic Baling Press of extra rugged construction with oversize rams for heavy gauge Sheet Mill Scrap. It is built in various sizes with capacities up to 20 tons per hour.

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INDUSTRIAL EQUIPMENT

Holder and Type

Acromark Corp., Elizabeth, N. J., has introduced a new Hercules holder and type for stamping numbers and letters into "hard-to-reach" positions on castings, forgings and

machined parts of steel, cast iron, bronze and other metals or material. Factors contributing to this is the extra body of this style type giving sufficient strength to permit required length necessary to reach into sunken cavities, and the additional support to the type body provided by the redesigned holder allowing it to extend to the limits that the marking position allows. Construction of the marking device in no way retards the quick changing type feature it formerly featured, it is said.

Extension Light

Hygrade Sylvania Corp., Ipswich, Mass., has introduced a new fluorescent extension cord light for use in close work and inspection such as

the restricted areas of bomber wings. The light fixture is so cool that it may be clipped to the worker's belt or hooked into the lapel of his coat, leaving both hands free, according to the company.

In replacing a deactivated lamp it is only necessary to remove two end cap screws, loosen two screws in other end and tilt back the guard. The unit consumes only 8 watts. Its protective grille is of heavy-gage steel. Greatest advantage of this P-7 unit, according to the company, is its low brightness, instrumental in reducing eye fatigue.

Aircraft Relay

General Electric Co., Schenectady, N. Y., announces a new 4-pole relay, designated CR2791-Glook, for aircraft applications. Its features are light weight, permanence of contact position and assurance of operation under severe vibration conditions,

and operation at high altitudes at rated current.

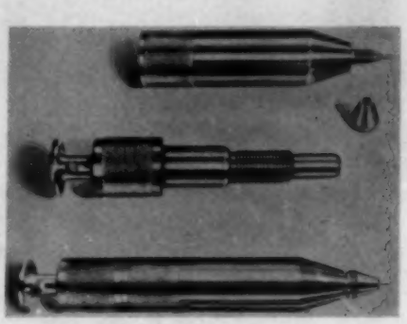
The relay has a maximum continuous current rating of 10 amperes at 12 or 24 volts direct current and a maximum make or break current rating of 50 amperes at 12 or 24 volts, direct current. The normally open contacts have a tip travel of 3/64-inch. The relay weighs 0.281-pound, and its coil wattage is 1.80. It measures 2½ x 1 5/32 x 1 25/32 inches.

Plomb Bob

Aero Tool Co., 231 West Olive avenue, Burbank, Calif., has introduced a new precision plomb bob particularly adaptable to armament and jig installation, as well as other operations where precision aligning is necessary. Its special feature is the novel use of phonograph needles to assure a true and constantly sharp point.

The needle is held by a watchmaker's pin chuck at the indicating end, and the hole for the suspension wire is held to exact size, and is absolutely centered with the indicating point. Upper part of the bob is threaded into the lower. Three bearing surfaces between these parts hold them concentric.

Thus by simply rotating one part

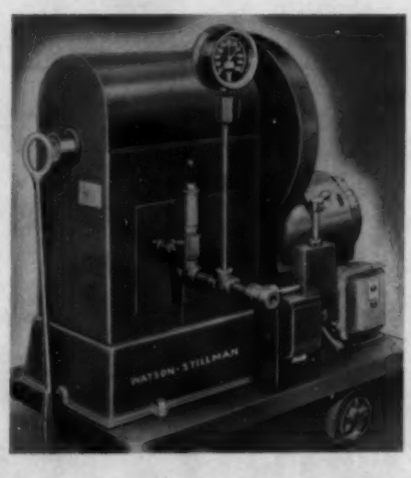


upon the other it is possible to raise or lower the indicating point over ½-inch without losing concentricity. This adjustment is said to be important in the aligning of gunsights and other armament installations.

Portable Test Pump

Watson-Stillman Co., Roselle, N. J., has introduced a new motor-driven, portable test pump for use in boilers, tubing and all kinds of high-pressure vessels. It, together with its motor, is mounted on a hand truck for portability, and all parts are enclosed for protection against air-borne abrasives.

The pump is a 3-plunger vertical



unit. Its ½-inch diameter plungers have a 2-inch stroke. Driven by the 3-horsepower motor at 100 revolutions per minute, the pump develops 8200 pounds per square inch

maximum pressure at ⅛ gallon per minute capacity. Equipment includes pressure gage, safety valve, needle valve for pressure regulation, motor, motor starter, disconnect switch and 25 feet of rubber cable.

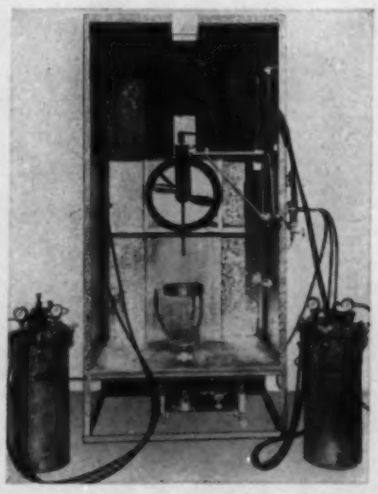
Tool Stands

Lyon Metal Products Inc., 3119 Clark street, Aurora, Ill., has introduced new tool stands to accommodate tools for workers on one, two or three-shift operations. These are especially suitable around produc-

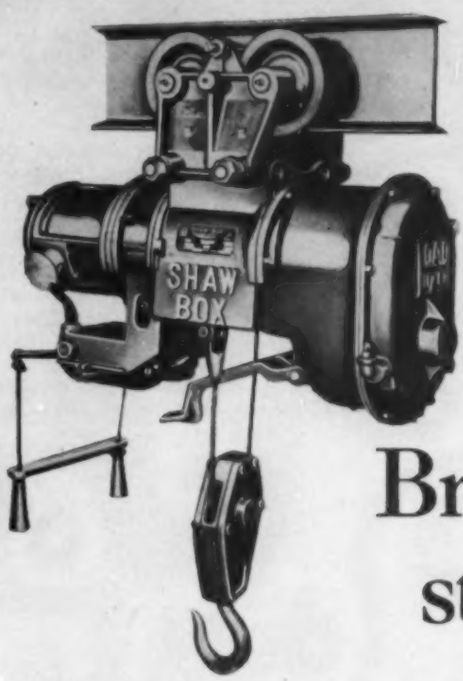
tion machines and toolrooms as toters up to the job; for assembly lines, parts and tool transporters for maintenance men. Drawers embodied can be locked and they are equipped with easy sliding and flat key locks.

Shell Sprayer

Eclipse Air Brush Co., 400 Park avenue, Newark, N. J., has placed on the market a shell sprayer for



spray coating 8-inch shell in a vertical position. It applies the inside coating with a semi-automatic spray gun fitted with a long extension

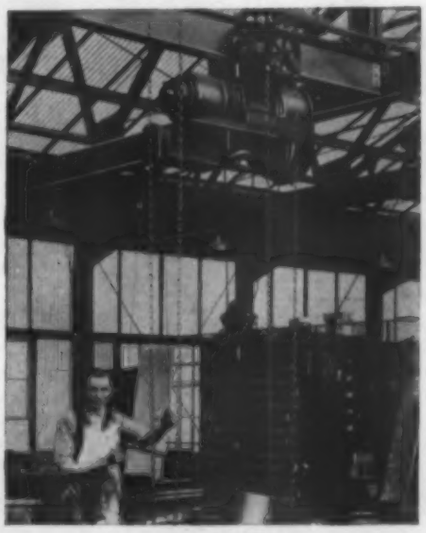


Brute for strength...

YET this rugged hoist embodies all that is fine in design and engineering. For the tough round-the-clock job, for trouble-free service and for versatile adaptability, you can do no better than install a Shaw-Box Load Lifter Hoist.

Here are some features:

1. "One-point" lubrication.
2. Hyatt Roller Bearings and Ball Bearing Motor.
3. Safety upper stop; lower blocks; sure brakes.
4. Two-gear reduction drive; sealed against oil leaks; steel interchangeable suspension.



'Load Lifter' electric hoists are built with lifting capacities of 500 lbs. to 40,000 lbs. in all combinations required for industrial lifting necessities. They are adaptable to almost every working condition within their capacities. Send for Bulletin 350.

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

'LOAD LIFTER' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load-Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

nozzle. The outside is sprayed manually by the same operator who handles the inside coating operation. Each shell is rotated by an air-motored tripod with a ring at the top to protect the driving band from paint.

Gear Shaver

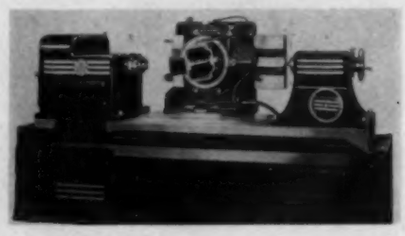
Michigan Tool Co., 7171 East McNichols road, Detroit, has introduced a new 865-36A rotary gear shaver utilizing the crossed-axis principle of gear finishing for handling gears up to 36 inches in diameter. It is equipped with two driving spindles.

As on a former machine, work on this unit is driven, the cutter in engagement with the gear "following" the gear. Three methods of finishing gears are available in this machine. In the first method, suited to finishing of wide face gears the cutter in addition to having an infeed toward the gear is also reciprocated parallel to the axis of the gear. This is accomplished by placing the slide which carries the cutter head in a horizontal position.

Amount of infeed, per stroke, length of stroke, number of oscillations after reaching center distance, etc., are all separately controllable, the controls being electrical.

In the second method, used for quick finishing of gears having narrower face width than the cutter, the slide is set vertically, the cutter, however, being in the same relationship to the gear as in the first method. Infeed is not used here, but the cutter head is located so the axis of the cutter and the axis of the gear, when viewed vertically, are at proper center distance from each other for correct depth of cut. In this second method, the gear is placed on the machine out of mesh with the cutter, the cutter is brought into mesh and the machine is started.

The third method represents a combination of the first and second methods. The cutter slide is again vertical, but infeed is used, the cutter head reciprocating vertically instead of horizontally as in the first method, the gear being finished by a number of vertical "passes" instead



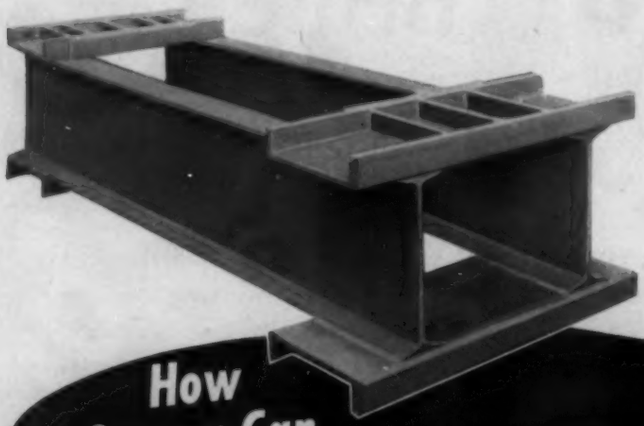
of one as in the second method. The last two methods are both suitable for gears having a narrower face width than that of the cutter.

Various colored lights are used to indicate to the operator the various circuit conditions existing during the operations. On this machine gears as small as 4 inches in diameter can be handled with cutters down to 8½ inches in diameter. Maximum cutter face width which can be used is 6 inches with maximum diameter of 12 inches. The spindle nearer the cutter handles gears from 4 to 18 inches in diameter, while the farther spindle is suitable for gears from 18 to 36 inches in diameter.

Straightening Machine

Medart Co., Potomac and DeKalb streets, St. Louis, is offering an improved line of 2-roll standard bar

and tube straightening, sizing and polishing machines. Eight sizes are now included in the line, ranging



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MACHINERY bases and frames can be welded by Graver in less time than would be required to make patterns for castings. Here's a definite saving of time—and no pattern expense.

A Graver-welded job is delivered to you ready for use—only a minimum of machining necessary. Again—time and money saved.

When a combination of two or more dissimilar metals—mild steels, alloy steels, steel castings or forgings—is required, they can be quickly welded into a single unit, thus increasing the life of the unit and eliminating repairs and replacement parts. That's a further saving in time and money.

There is no dead weight in Graver-welded machine bases. Ample strength and weight where needed, but no excess metal.

Modern equipment plus expertly trained and experienced welders insure a finished product that will meet the most rigid requirements both in specifications and inspection, and the phrase "Welded by Graver" has come to mean complete satisfaction—economy—and production speed—to Graver customers.

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from a bar and tube capacity of 1/16 to 9 inches in diameter.

Models in the line feature greatly increased speed and facility of operation. The wider angularity of roll adjustment now possible gives a greater variation in work operations, ranging from adjustments for high speed straightening to more exacting operations of sizing and polishing on all types and conditions of bars.

Rolls are of Smavroc forged tool steel, heat treated, tempered and highly polished. The concave roll is of Medart design. The outstanding features of "continuous, end-to-end feeding" and "instant reversal of workpiece direction" have been retained in these newer models.

Weighing Scale

Beaumont Birch Co., 1501 Race street, Philadelphia, has introduced a new automatic weighing scale for handling coal and other free-flowing bulk materials rapidly and accurately. It is a totally enclosed unit with

a dust-tight welded steel case.

Scale's outstanding feature is a vibrating metal feeder deck which conveys the material from feed hopper. It is being offered in three standard units to handle quantities from 1 to 30 tons per hour. Larger sizes having weighing capacities up to 60 tons per hour can be furnished.

Service Stations

Alemite Division, Stewart-Warner Corp., 1800 Diversey Parkway, Chi-

cago, is offering three new portable service stations for industrial lubrication. Each is designed for mounting on hand or electric trucks, to enable on-the-spot lubrication of equipment in all parts of a plant.

Other outstanding features include ease of operation—each unit can be handled by one man, or several operators can work from the same unit simultaneously; convenient hose lengths which facilitate servicing; combination of control valve and meter for registering amount of lubricants used; outlets for both high pressure and volume lubrication; facilities for handling all grades of grease, oils and slushing compounds. The standard models of 4 and 6-unit capacity, include a high pressure pump with 20 feet of hose on reel, for power lubrication of pressure gun fittings, also low pressure power pumps with 15 feet of hose on reel for dispensing gear lubricants and machine oils. Two or more hand-operated low pressure pumps, depending on model size, for dispensing lubricants and oil, and a hand-operated pump for loading hand guns, are part of the equipment.

Advance models have capacity for six 50-pound lubricant units. Pumps include one of high pressure with 20 feet of hose on reel for pressure gun lubrication, and

Everlasting Fastenings
BRASS
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Harper's Fastenings are fighting the Axis and fighting corrosion. They are being used on a multiplicity of war equipment . . . such as ships, planes, guns and tanks . . . because they successfully defy rust, corrosion and other tough conditions. Practically speaking, they are "Everlasting."
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The H. M. HARPER COMPANY, 2646 Fletcher St., Chicago; 45 W. Broadway, New York City.
HARPER Chicago
EVERLASTING FASTENINGS

two of low pressure with 15 feet of hose on reel for gear lubrication.

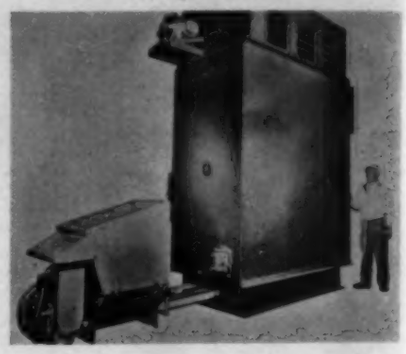
Outstanding feature of the Advance model is a power head of magazine type which can be transferred readily from one pump to another making each a power-operated pressure pump. All models are suplied with air compressor, or with air hose for quick connection to plant air lines.

Coal-Fired Unit Heater

Dravo Corp., Neville Island, Pittsburgh, has placed on the market a coal-fired unit heater equipped with an under-feed stoker of either bituminous or anthracite type. It also is being offered with either hopper or bin feed for hand firing with undergrate fan.

Units are available in eight sizes from 750,000 to 4,000,000 B.t.u. output per hour. Each heater is entirely self-contained, having its own combustion chamber and distributing warm air either directly from outlet vents into the area to be heated, or through a simple duct system.

The coal burning series follows the combustion plan previously used in oil and gas-fired heaters sold by Dravo. Corrugated combustion chamber with its fins and deflectors makes possible heat transfer to a moving air stream about the same



rate per square foot of surface as obtained in the boiler and transmission of heat from combustion chamber to water.

Furnace temperatures are kept down because the large portion of the heater surface above the refractory is in sight of the fire. Practically three-fourths of the heat recovered is by means of radiation into this "black surface" in the upper part of the combustion chamber. The bridgewall also is cooled by means of a duct through its center which conducts a flow of air from one side of heater to the other.

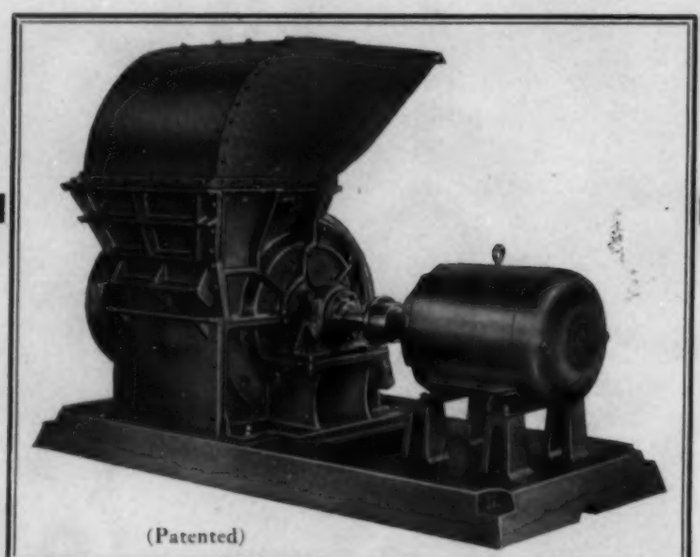
Industrial Wheels

French & Hecht Inc., Davenport, Iowa, announces a line of cast, semi-steel industrial wheels, suited to a wide range of materials handling services, in diameters from 4½ to 20 inches. Wheels in the line feature molded-on solid compound tires. As three types of compounds are available, the wheels can be equipped with a compound best suited to meet conditions to which they are subjected.

One type compound, the standard, is used for all normal duties; the resistant compound tire for service where oils, ordinarily destructive to

rubber and certain compounds, are prevalent; and static-dissipating compound for use in ordnance and chemical plants, flour mills, grain elevators and other establishments where static discharge is a hazard.

Also offered by the company is a brickbarrow wheel with solid, molded-on compound tire, 16 inches outside diameter, with plain or roller bearings and Nu-Seal bearing protectors.



(Patented)

THE AMERICAN RING TURNINGS
CRUSHER

Utilizing the famous rolling ring principle of crushing, this crusher reduces long curly turnings of low or high carbon steel, alloy steel or brass into "Chips" as the turnings are fed into the feed hopper. Turnings cease to be a bother after you put the proper size American Ring Turnings Crusher on the job; it even pays for itself before you know it. These crushers are not an experiment: they reduce the toughest turnings, and are built to withstand severe requirements. Made in various sizes for various needs. You are invited to take advantage of our free consultation service.

THE RINGS ARE THE WHY

AMERICAN PULVERIZER CO.

1539 MACKLIND AVE., ST. LOUIS, MO.

Flame Hardening

(*Continued from Page 82*)

cautions against overlapping or reheating of hardened bands, extra quench jets should be provided at both ends of the heating tip, and in some cases an auxiliary cooling flow of water may be directed at the adjacent zones. This should be held as close to the flames as possible.

The band progressive method is generally used in cases where it is not essential that the hardness be perfectly uniform over the entire length and on parts whose extremely large diameters make it economically impractical to employ the spinning methods. It is also employed on parts having flanges or shoulders which confine the area to be hardened as shoulders sometimes prevent the use of the other methods.

Spiral Band Progressive Method: While the foregoing method is suitable for hardening either localized bands such as bearing surfaces or for treating the entire length of a shaft or cylinder, the spiral band progressive method is somewhat better suited to the latter type of work. In this method, as the work revolves, the heating tip is moved laterally at such speed as to move one tip-width along a line parallel to the axis with each complete revolution of the work, thus heating a continuous spiral band covering the entire surface of the work in one operation.

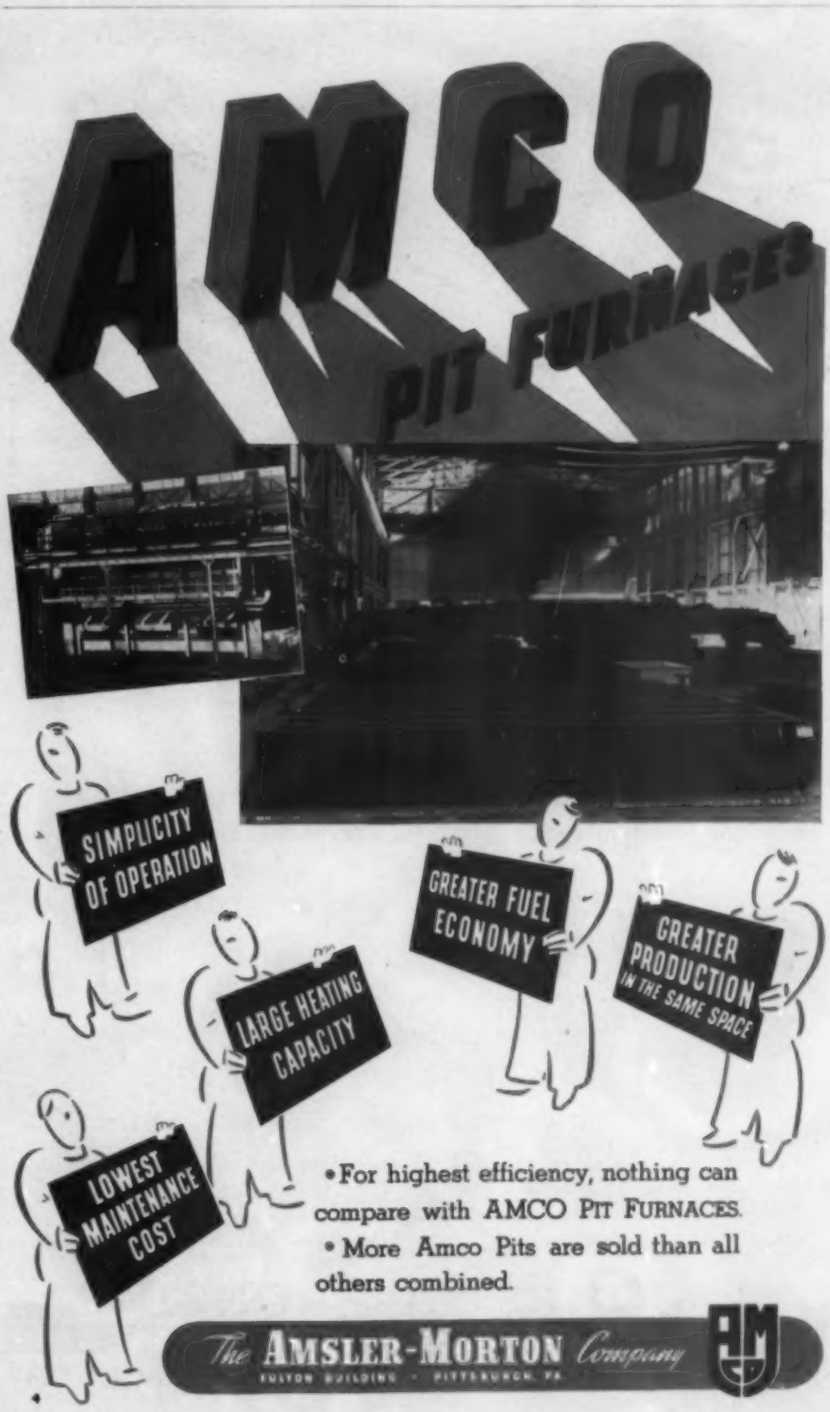
The same precautions against overlaps and edge zone softening should be observed as in the band progressive method. In addition a separate water quench should be provided at the ends of the work to prevent burning of the edges as the flames start and finish the spiral. The advantage in this technique is the elimination of soft end zones, which occur at the starting-stopping point of each band in the band progressive method.

Hardening Threads: Heavy spiral threads may be flame hardened using an adaptation of this technique. Instead of a broad, multi-flame tip, a 2-flame bulbous type tip is recommended, one flame serving as a preheater. Torch travel is synchronized with the thread turns, with both flames directed at the root of the thread. Water quenching jets are provided immediately behind the flames, covering two threads, and a secondary quench is placed several threads behind. The size of tip and distance from the work vary with the thread size and must be determined in practice. Quenches must be so positioned as to prevent any drawing action from the areas already hardened.

The method described above may be applied to hardening Acme and small worm threads, and large Brown & Sharpe screw threads. Large worm threads are hardened in the same way except that standard gear hardening tips are employed, providing for uniform heating and hardening of both sides of the thread.

Mounting the Work: Where it is impractical to set up large cylindrical objects on a lathe, they may be mounted on a pair of rollers and rotated by suitable means. Torch movement is then provided by mounting the heating tip and quench on a Radiograph or other machine capable of giving slow lateral motion parallel to the axis of rotation of the work and synchronized with its rotation to effect a spiral hardened band without overlapping. This setup is used principally on external surfaces, but it may also be applied to large diameter internal surfaces.

Band Spinning Method: For hardening comparatively narrow bands of complete circumference the band spinning method produces far better results than the progressive method previously described, principally because soft zones are eliminated. It is best applied to small and medium diameter cylindrical ob-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PIT FURNACES
SIMPLICITY OF OPERATION
LARGE HEATING CAPACITY
LOWEST MAINTENANCE COST
GREATER FUEL ECONOMY
GREATER PRODUCTION IN THE SAME SPACE
• For highest efficiency, nothing can compare with AMCO PIT FURNACES.
• More Amco Pits are sold than all others combined.
The AMSLER-MORTON Company
FULTON BUILDING · PITTSBURGH, PA.

jects and may also be used for small gears and screws. There are no overlaps or soft zones, and the uniform, overall heating before quenching permits hardening to any desired depth of penetration. Where the quantity of production warrants the increased investment in equipment, the spinning method is by far the most satisfactory.

As in the methods already outlined, a broad flat tip of the width of the band to be hardened is employed. The quench may be incorporated in the heating tip or be separate from it. In either case, the heating and quenching are separate, successive operations. The work is mounted on a spindle or lathe and revolved at a surface speed of about 1000 circumferential inches per minute. The flames are allowed to impinge upon the work for only a brief period, usually less than 1 minute and often as little as 10 seconds on small diameters. Simultaneously with the extinguishing of the flames the quenching jets are turned on and allowed to play upon the spinning part until it is fully cooled.

Two or more heating tips spaced equidistant around the work may be used on the larger diameters to assure a short heating interval and thereby to secure the desired surface hardening effect with shallow penetration.

The speed of this process lends itself to automatic co-ordination and control. If the parts to be hardened are small, they may be released automatically from the spindle and dropped into a quenching bath, rather than using specifically located quenching jets. Small gears may be hardened readily by this spinning method, the only precaution necessary being that the flames should be withdrawn somewhat so as not to burn the tops of the gear teeth. The gear revolves in a soaking heat instead of the more intense heat commonly applied, thereby causing uniform heating of tooth faces and root as well as the top.

An example of how automatic control features may be adapted to the spinning process is found in a shop where gasoline engine crankshafts are hardened on four bearing surfaces. Since the four surfaces are not all the same width, the heating time is adjusted for each by a cam movement controlling the lighting and extinguishing of the four sets of heating flames. Heating time varies from 45 seconds for the narrowest bearing to 56 seconds for the widest, and the entire hardening process is completed in 2 minutes. The work is done on a converted lathe bed, and production on this operation totals 175 crankshafts per 8-hour day.

(Continued In August 3 issue)

National Cylinder Markets New Fluxes

New line of four welding fluxes for both ferrous and nonferrous metals is being offered by the National Cylinder Gas Co., 207 West Wacker drive, Chicago. Field-tested on jobs of all types, precautions have been taken on the whole line to reduce noxious fumes, bubbling and boiling.

Flux No. 1 is for welding cast iron. It floats to the surface the heavy oxides which form during welding and keeps them liquid so that a dense, nonporous and ductile weld can be produced.

No. 2 is a cast iron brazing flux which produces a good bond at low base temperature and holds the bronze being applied at a uniform molten consistency.

No. 3 brazing flux, suitable for brass, bronze, copper, steel and malleable iron is so compounded that it reduces atmospheric oxidation and keeps flux glaze at a minimum.

The fourth flux, No. 22, is an aluminum flux for sheet, cast, wrought and alloys. Its fluxing action is fast and effective as it floats out oxides and impurities which form during welding.

Completely Machined

You save time two ways when you purchase Johnson Universal Bronze Bars. First, you get excellent delivery service...on more than 350 stock sizes.

Then, Complete Machining–I.D.–O.D. –ENDS–eliminates costly machining . . . eliminates all danger of imperfections or undersurface defects. Why not try Johnson UNIVERSAL Bronze on your next job? Your local industrial supply distributor carries a complete stock.

Write for free **STOCK LIST**

JOHNSON BRONZE

Sleeve BEARING HEADQUARTERS

550 S. MILL STREET • NEW CASTLE, PA.

Issues New Arc Welding Inspection Chart

Lincoln Electric Co., Coit road, Cleveland, has issued a new handy arc welding inspection wall chart suitable for serving as a quick check reference for inspectors checking welds. Its illustrations show the inspector what the beads look like if the current is too low, normal, too high or if the speed is too low or too high.

The chart also illustrates the Fleet-Fillet technique of welding and, by means of a graph, shows how large electrodes speed up welding production.

Develops Subsitute for Grinder Feed Wheels

Safety Grinding Wheel & Machine Co., Springfield, O., announces a newly developed substitute for rubber in the manufacture of regulating wheels for centerless grinders. Called Saftoid, the product is reported to cost less and give the same service as the rubber wheels.

Tubing, Converter Steel Topics of ASTM Meeting

Notable in the session devoted to steel at the forty-fifth annual meeting of the American Society for Testing Materials at Atlantic City, N. J., recently, was the report of committee A-1, presented by Norman L. Mochel, chairman, also a paper discussing the comparative quality of converter cast steel.

Particularly important recommendations made by the committee report were those in the field of pipe and tubing, where a new method of determining elongation values based on pipe wall thickness is being established in two of the country's most basic specifications for welded and seamless steel pipe (A 53) and for lap-welded and seamless steel pipe for high-temperature service (A 106).

Incorporated in these standards is a new method of determining flattening test requirements by means of a formula which establishes more rational values based on pipe sizes and grades. These two specifications also will permit the use of acid bessemer seamless material and the electric resistance welding process.

At the meeting, two new pipe specifications also were approved, one covering copper-brazed tubing suitable for general engineering uses, and the other covering welded alloy open-hearth iron pipe.

A paper by Sims and Dahle, Battelle Memorial Institute, discussed the quality of converter cast steel. It described results of rather extensive tests in comparison with steels made by other melting processes. It reveale . . . similar compositions the mechanical properties at room temperature followed well known effects of composition and inclusion type.

Low-temperature notched-bar impact properties were found to be dependent upon deoxidation practice without relation to process of manufacture. The same was true with strain age-hardening effects. Standard fatigue and notched-bar fatigue results are in accord with tensile properties, rather than with notched-bar impact properties.

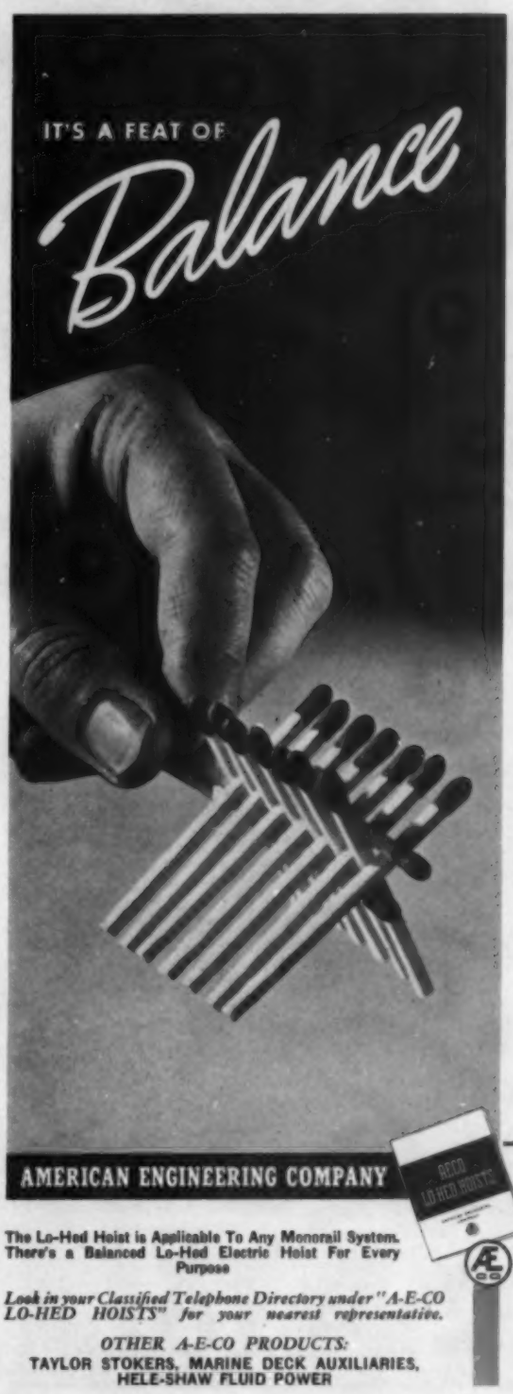
According to the authors, the melting medium is of little moment in determining the properties of cast steel.

Keep Welding

(*Continued from Page* 90)

lowers insulation resistance and cuts down creepage distances.

Steel mill dusts are usually highly conductive, if not abrasive, and lessen creepage distances. Other dusts are highly abrasive and actually cut the insulation in being carried through by the ventilating air. Fine cast iron dust quickly



AMERICAN ENGINEERING COMPANY

The Lo-Hed Hoist is Applicable To Any Monorail System. There's a Balanced Lo-Hed Electric Hoist For Every Purpose

Look in your Classified Telephone Directory under "A-E-CO LO-HED HOISTS" for your nearest representative.

OTHER A-E-CO PRODUCTS:
TAYLOR STOKERS, MARINE DECK AUXILIARIES, HELE-SHAW FLUID POWER

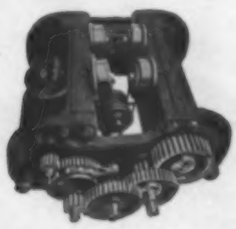
BALANCE

was only the beginning of the story of this hoist

When one of our representatives saw the picture of this ad he said, "Yes, this illustrates our big point, the balanced arrangement of the motor and drum about the beam. But there's more to the Lo-Hed story in these times than balance. Listen . . .

"When I see a customer, I don't have to sell him on balanced design, all-spur gear drive, heavy duty hoist motor and all other features. The customer takes me by the arm out into the plant, points to a Lo-Hed and says, 'See that Lo-Hed? Been running every day for 5 years . . . on three shifts now . . . not a cent for repairs yet.' Then the customer sells *me* on a Lo-Hed."

We make no claim that a Lo-Hed will run for 5 years or 10 years without a cent for upkeep. But it is true that Lo-Heds are precision built to last for years. It is true that they have an exceptional record for low maintenance. And it is true that they sell themselves to customers. If you need an electric hoist now, buy one that will be on the job years from now. Buy a Lo-Hed. Send for the 28-page Lo-Hed catalog today.



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2484 Aramingo Avenue, Phila., Penna.

☐ Please send me your complete catalog of LO-HED HOISTS.

☐ Ask your representative to get in touch with me promptly.

Name.....

Company.....

Street Address.....

City..... State.....
(Please print plainly)

penetrates most insulating materials.

Hence the desirability of inspecting motors periodically. If conditions are extremely severe, weekly inspection and partial cleaning are desirable. Most motors require a complete overhauling and thorough cleaning about once a year.

Once a Week: For the weekly cleaning, the motor and generator should be blown out with dry compressed air (about 25 to 30 pounds per square inch in pressure.) Where conducting and abrasive dusts are present, even lower pressure may be necessary, and suction is to be preferred, as damage can easily be caused by blowing the dust and metal chips into the insulation. On most motors the windings are fairly accessible, however, and the air can be properly directed to prevent such damage.

Once a Year: About once a year, welders should be overhauled. First, the heavy dirt and grease should be removed with a heavy, stiff brush, wooden or fiber scrapers and cloths. Rifle-cleaning bristle brushes can be used in air ducts. Dry dust and dirt can be blown off, using dry compressed air at moderate pressure. Care must be taken to direct the air so that the dust will not cause damage and will not be pocketed in the various corners. Grease, oil and sticky dirt are easily removed by applying cleaning liquids such as carbon tetrachloride.

If the welder can be spared from service long enough, the insulation of the motor should be dried out by heating to from 90 to 100 degrees Cent. While the motor is still warm, a high-grade insulating varnish should be applied.

The varnish may be sprayed or brushed on. After applying the varnish, the best results are obtained by baking for 6 to 7 hours at about 100 degrees Cent. If the machine must be put back into service quickly, or if facilities are not available for baking, fairly good results will be obtained by applying one of the varnishes which dry in a few hours at ordinary room temperatures.

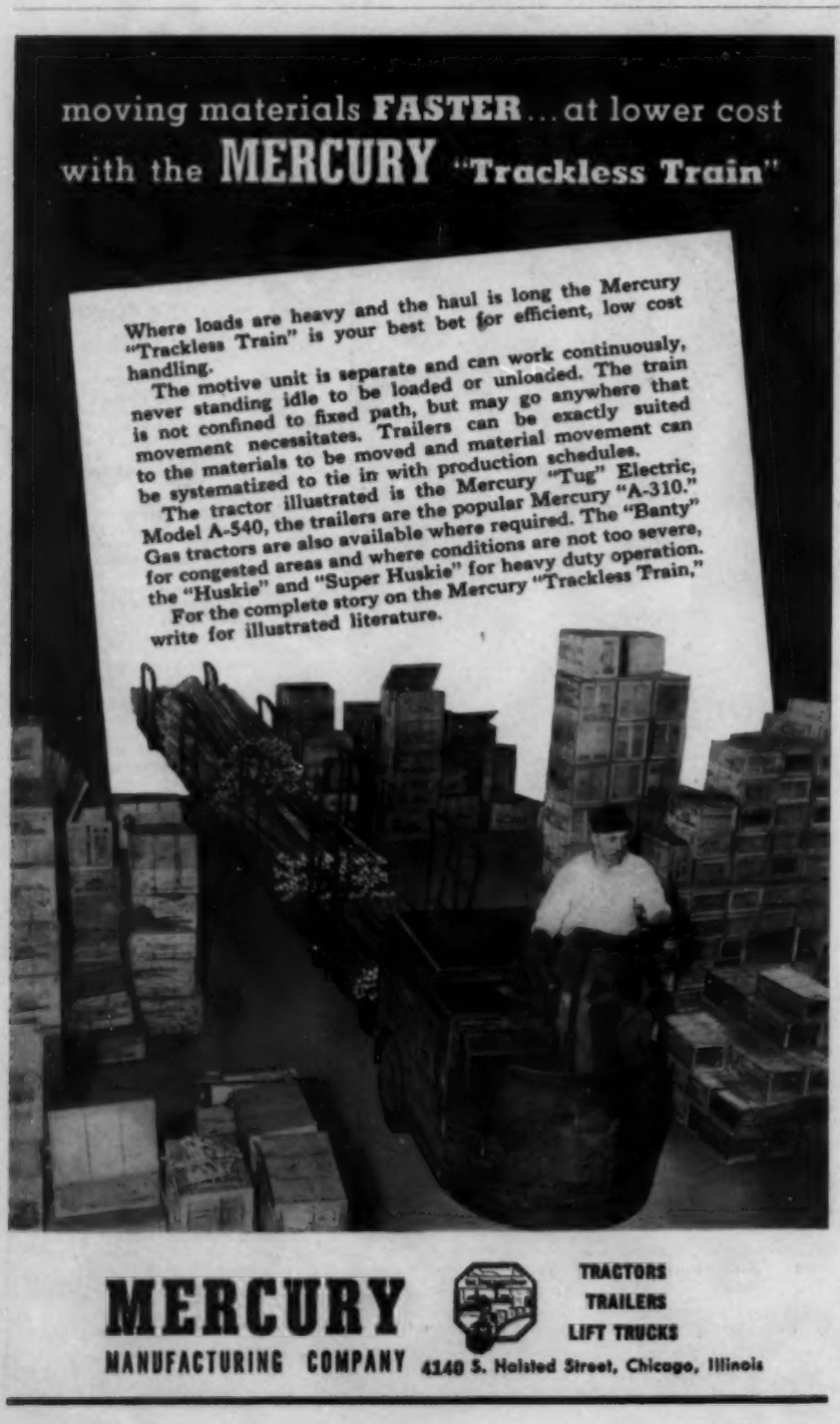
Lubrication: Manufacturers' instructions regarding lubrication of bearings should be carefully noted. These instructions should be kept near the welder so that they are readily accessible. Usually grease-packed bearings have sufficient lubricant when shipped from the factory to last about a year under normal conditions of cleanliness and temperature. When sets are operated in unusually dirty atmospheres, run continuously 24 hours per day, or exposed to extremes of temperature, it would be well to shorten the bearing inspection and lubrication interval down to six months or less if experience warrants. An occasional check of bearing temperature by feeling with the hand may disclose undue heating before damage is actually done. Once a lubricating routine has been established, it should be carried out, and by reliable men who will follow instructions.

It is pretty generally established that outside of gross neglect for long periods of time, the major causes of bearing troubles are overgreasing and dirt. Overgreasing results in excessive heating of the bearing, frequently with churning and breaking down of the grease with consequent loss of its protective qualities.

Dirt occasionally gets into a bearing through the use of grease that is carried around or stored in uncovered containers. Quite as frequently it gets in through carelessness in protecting parts while bearings are disassembled or opened for inspection. The prevention is obvious but often overlooked:

Every part of a bearing assembly, including retainer plates, gaskets and screws should be placed in a clean box immediately on removal, and if dropped or otherwise soiled, should not be replaced without a thorough cleaning in a suitable solvent.

None but clean hands, tools and rags should ever be allowed to


moving materials FASTER... at lower cost
with the MERCURY "Trackless Train"
Where loads are heavy and the haul is long the Mercury "Trackless Train" is your best bet for efficient, low cost handling.
The motive unit is separate and can work continuously, never standing idle to be loaded or unloaded. The train is not confined to fixed path, but may go anywhere that movement necessitates. Trailers can be exactly suited to the materials to be moved and material movement can be systematized to tie in with production schedules.
The tractor illustrated is the Mercury "Tug" Electric, Model A-540, the trailers are the popular Mercury "A-310." Gas tractors are also available where required. The "Banty" for congested areas and where conditions are not too severe, the "Huskie" and "Super Huskie" for heavy duty operation.
For the complete story on the Mercury "Trackless Train," write for illustrated literature.
MERCURY
MANUFACTURING COMPANY
TRACTORS
TRAILERS
LIFT TRUCKS
4140 S. Halsted Street, Chicago, Illinois

touch a bearing.

Grease must be clean. If there is the slightest doubt of its purity, it should be thrown away. Grease is cheap compared with bearings and lost man-hours. Only a high grade of grease should be used for ball-bearing lubrication.

Brushes: Brush inspection is important. The first essential requirement for the satisfactory operation of brushes is the free movement of the brushes in their holders. Uniform brush pressure also is necessary to assure equal current distribution. Adjustment of brush holders should be set so that the face of the holder is approximately ⅛-inch up from the commutator; any distance greater than ⅛-inch may cause brushes to wedge, resulting in chattering and excessive sparking.

It is essential that the correct grade of brush for a specific application be used. Recommendations as to the correct grade of brush

Table I—Trouble, Causes and What To Do

Trouble

Machine fails to hold heat

Causes

Rough or dirty commutator
Brushes may be worn down to limit of adjustment or life
Brush springs may have lost adjustment or may be broken
Field circuit may have variable resistance connection or intermittent open circuit
Electrode lead or work lead connections may be poor
Wrong grade of brushes may have been installed on generators
Field rheostat or tap switches may be making poor contact and overheating
Brush-shifting or other mechanical current-adjusting mechanism may have loose or worn links

What To Do

Commutator should be trued or cleaned
Replace or readjust brushes
Replace or readjust brush springs
Check field current with ammeter to discover varying current. This applies to both the main generator and exciter if used.
Tighten all connections
Check with manufacturer's recommendations
Inspect rheostat and clean and adjust finger tension on switches
Check current-adjusting mechanism for back-lash and play

Trouble

Motor trips off line

Causes

Power circuit may be single-phased
Welder may be operating above current capacity
Welding electrode or work leads may be too long or too small in cross section
Ambient temperature may be too high

What To Do

Check for one blown fuse or dead line
Check load against welder name-plate. Check duty cycle
Check terminal voltage while machine is loaded; it should not exceed 30 volts on small machines or 40 volts on large machines when operating at rated current
Make sure that temperature in motor-generator room or housing does not exceed 100 F. and that there is no interference with normal ventilation of the machine

Trouble

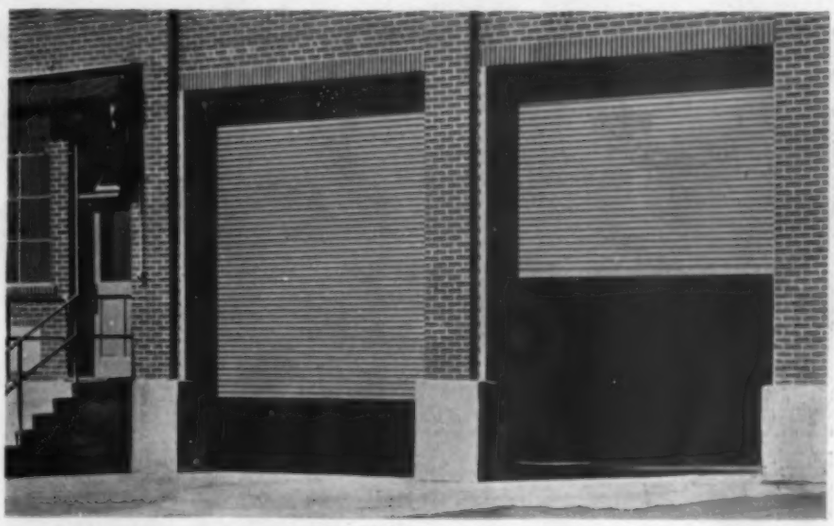
Machine fails to start

Causes

Power circuit may be completely dead
Power circuit may be single-phased
Power line voltage may not be suitable for motor, or may be extremely low; may be accompanied by chattering of the motor starter.
Machine may be jammed
Motor starter may be single-phased
Overload protecting relays may be tripped

What To Do

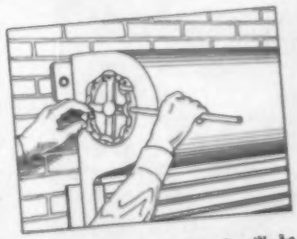
Look for open disconnect switch, fuses removed from clips, or blown fuses



HOW TO MAKE LONG-LASTING DOORS LAST *STILL LONGER* Long before high-speed day-and-night war production began to throw severe, extra demands on all industrial equipment, Kinnear Rolling Doors had proved their capacity for long-lasting, low-cost service under hardest use. To make sure that your rolling doors give you *every extra ounce* of time-saving convenience for the duration, *and long after,* we offer the following maintenance suggestion:

ADJUSTING

See that the spring tension of manually operated doors is adjusted for smoothest, easiest operation. Just remove the pin from the adjustment wheel (see sketch), insert a steel rod in one of the holes, increase the spring tension by turning the wheel clockwise to the required point, and replace the pin. If the tension is too great, turn the wheel in the opposite direction.



1st in a series, this ad will be followed by several others suggesting simple steps that will keep Kinnear Rolling Doors operating at peak efficiency through extra years of service.

THE KINNEAR MFG. CO., 1780-1800 FIELDS AVENUE, COLUMBUS, OHIO

SAVING WAYS IN DOORWAYS

KINNEAR ROLLING DOORS

Look for one blown fuse or one dead line
Check voltage with voltmeter, particularly at the moment of attempted starting
See that armature turns over easily by hand, and look for foreign material in air gaps
Check to see that all fingers on starter make contact when closed
See that relay contacts are closed and that starter picks up when push button is pressed. Be sure to remove cause of tripping

Trouble

Welder starts but fails to generate

Causes

May be running the wrong way
Generator or exciter brushes may be loose or missing
Exciter may not be operating

Field circuit of generator or exciter may be open
Generator may be reversed in polarity due to another machine or incorrect operation in parallel with another machine
Series field and armature circuit may be open-circuited

What To Do

Check direction of rotation with manufacturers instructions or direction arrow. On 3-phase motors, direction of rotation may be changed by interchanging any two leads
Be sure that all brushes bear on the commutator and have proper spring tension
Check exciter output voltage with voltmeter or lamp
Check for open circuits in rheostat, field leads, and field coils. Also check resistors and rectifiers, if any. Some machines give low output when fields are open.
*Flash the field with a storage battery or another generator first with one polarity and then with the other to see if it builds up (Flash exciter field if set has separate exciter)
Check circuit with ringer or voltmeter

Trouble

Welding arc is loud and spatters excessively

Causes

Current setting may be too high
Polarity may be wrong

What To Do

Check setting and current output with ammeter
Check polarity
Try reversing polarity or try an electrode of the opposite polarity

*"Flashing" the field of a generator or exciter is a method of establishing the residual magnetism of the field structure with the proper polarity to cause the machine to "build-up," or generate voltage. It consists of passing a relatively heavy current through the field windings momentarily, using an external source of direct curent to supply the power.

If a low-voltage source, such as a storage battery, is used, the series field of the generator should be flashed; if a higher voltage source such as another generator or exciter is used, the shunt field should be flashed.

should be obtained from the manufacturer of the welder only.

Broken brushes imply two possibilities: Incorrect brush grade or mechanical defects (such as unbalanced, rough or eccentric commutator). To eliminate brush breakage, both factors should be corrected.

Check the brushes to make sure that they will not wear down too far before the next inspection. Keep extra sets of brushes available so that replacement can be made when needed. It is false economy to use brushes down to the absolute minimum length before replacement. Cases have been known where brushes have worn down until the metal, where the pigtail connects to the brush, was touching the commutator. This, of course, was causing damage to the commutator.

Make sure that each brush surface, in contact with the commutator, has the polished finish that indicates good contact, and that the polish covers all of the surface of the brush. When replacing a brush be sure to put it in the same brush

Stuart's Cutting Oil Service will help you get the most out of Minutes, Metals and Machines

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AMERICA'S FIRST TRANSPARENT SULPHURIZED CUTTING AND DRAWING OIL

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Example after example can be cited where management and technicians of vital war products plants, government and private, have worked with Stuart Oil Engineers to solve new and difficult problems that were barriers to peak production. The key to every such solution has been found in an open-minded approach—close cooperation—in using unbiased judgement — and a determination to achieve results.

This is why we feel that you will find Stuart Oil Engineering Service helpful in solving metal cutting problems. It has been our job since 1865.

For All Cutting Fluid Problems
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holder and in its original position. It has been found helpful to scratch a mark on one side of the brush when removing it, so that it will be replaced properly.

When installing new brushes, fit them carefully to the commutator. Sand only until the curve of the brushes is the same as that of the commutator. Be sure that the brush shunts (pigtails) are fastened securely so that current will not overheat the brushes and brush holders.

Check the springs that hold the brushes against the commutator.

Commutators: Inspect the commutator for color and condition. It should be clean, smooth and glossy, with a color varying from straw to chocolate brown where the brushes ride on it. A bluish or reddish color indicates overheating of the commutator. Roughness of the commutator should be removed by sandpapering or stoning. Never use emery cloth or an emery stone. Use a "fine" stone or number 00 sandpaper unless the commutator is in bad condition, when the job may be started with a "coarse" stone and finished with "fine."

For this operation, press the stone or sandpaper against the commutator with moderate pressure with the motor running, and move it back and forth across the commutator surface. Use care not to come in contact with live parts.

If the commutator is very rough as evidenced by pronounced up and down vibration of the brushes, the armature should be taken out and the commutator turned down in a lathe. When this is done, it is usually necessary also to cut back the insulation between the commutator bars slightly. If the commutator is found to be dirty when the generator is inspected, it should be wiped clean with a piece of canvas or other cloth that is free from lint.

Never put oil on the commutator. Proper selection of brushes gives the commutator all the lubrication required to prevent excessive wear and to build up a good smooth operating glazed surface on the copper.

Transformers: The arc welding transformers of alternating-current welders require a minimum of maintenance, but this fact should not be allowed to result in neglect. On fan-cooled units, fans should be cleaned and lubricated about once a year. Windings should be blown out at least twice a year in very clean locations, and more often in dusty places. At the time of this periodic attention, all connections and coil supports should be checked for tightness. Manual current adjusting mechanisms should be lubricated often enough to prevent stiff operation of the hand-wheel or crank, making sure that a fairly high melting-point grease is uniformly distributed over the full length of screws and guides. On motor-operated controls, lubrication at more frequent intervals may be required, as evidenced by slowing down of the motor or noise from the gearing. This point should be checked at least three times a year, and more often if experience justifies it.

Abuses: While most welding equipment is designed to stand up under unusually adverse operating conditions, some not infrequent circumstances will cause serious impairment of not complete interruptions of their service.

One bad practice, for example, is that of leaving weather-protecting tarpaulins thrown over machines in operation, in such a way as to interfere with the free passage of ventilating air into and out of the equipment. Cases are known where welders have been equipped with canvas flaps permanently installed on inlet and exhaust air openings, resulting in severe overheating and very short equipment life.

Improper connection of extension leads for either the electrode or work terminals is not at all uncommon. This results in a high resistance circuit from welder to arc and return with resulting variations in welding current, particularly when the leads are moved

Direct Mounted Car Drives
for Convenience and Safety
Do you have to wait until your crane is free before you can move your furnace cars? Do you have a winch taking up valuable floor space and cables stretched across the floor which create a safety hazard?
R-S furnace cars can be furnished *electrically operated* with drive mounted directly on the car. Merely plug in a cable, push a button and the car moves smoothly. The only limit to length of travel is the length of cable.
The broad experience of R-S in the designing and operation of industrial furnaces can help you *now*. Draw upon it for complete satisfaction in your metallurgical heating processes.
R-S PRODUCTS CORPORATION
122 Berkley Street
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R-S
R-S Furnaces of Distinction
BUY WAR BONDS

so as to change the resistance of the connections. This is a frequent cause of complaints by welding operators that the heat is not steady. The remedy for this is to make sure that connections are kept tight, and that all connections are made with cables equipped with properly installed cable lugs or terminals. It is practically impossible to bolt or wedge untinned flexible cable to another conductor and secure a good low-resistance joint. Soldered or reliable solderless connectors or terminals should always be used.

The use of excessively long electrode or work leads with motor-generator type welders will result in overheating of the motor when operating in the upper part of the current range unless extraordinarily large cables, or a number connected in parallel, are used. Overheating, of the motor from this cause is a frequent reason for motor-generator welders tripping off the line with consequent loss of production.

A source of trouble which is not protected against by the motor overload relays is the intentional or unintentional application of long continued short circuits on the generator. Poor cable or cable connection insulation may be responsible for unintentionally short circuiting a generator for long periods of time. This results in the flow of very heavy generator current, but because of the low generator voltage involved, does not require sufficient power input from the line to cause the motor overload relay to trip. While the motor is not damaged, the generator may be seriously overheated or burned out.

The use of improperly bonded structural steel systems or building frameworks for the welding current return circuit is undesirable. The high resistance path thus afforded the welding current may result in overheating of the welder motor, and in addition, there is always the possibility that arcing or overheating of some poor connection, possibly quite remote from the scene of operations, may go unnoticed and start a fire.

No attempt should be made to adjust welding current output by any means other than those provided and recommended by the manufacturer of the equipment. Shifting the brushes on generators not designed for brush-shifting control will usually result in inferior welding characteristics, impaired commutation, and short brush life.

In transporting welding equipment, rough handling resulting in permant mechanical damage is all too frequent. Motor-generator sets mounted on steel wheeled running gear should be moved only at slow speeds—never behind fast-moving trucks or other vehicles. They should be eased over obstacles and depressions such as flange clearance grooves in tracks. Slings used for transportation of welders by crane should be carefully arranged to avoid damaging control boxes, handles, and other equipment mounted on the outside of the set.

Care should be taken to avoid using arc welders out-of-doors in unfavorable weather. Many machines now on the market are designed to be both semiprotected and dripproof. This does not mean, however, that these welders should be used in rain or other precipitation without suitable protection.

At the discretion of the user, of course, dripproof or even open motor-generator sets can be operated out-of-doors, provided they are protected from obviously damaging conditions by tarpaulins or temporary shelters. These must be arranged so as not to hinder ventilation of the equipment, as previously discussed.

Common troubles and their remedies: In spite of the reliability of the modern arc welder, troubles will occur. The causes and remedies for the majority of such troubles are given in Table I.

MANY WAR FACTORIES BASE THEIR PRODUCTION STRATEGY ON THOMASTRIP DEPENDABILITY AND PERFORMANCE . . .

THE DEMAND for higher and still higher production places more rigid demands upon your cold rolled strip steel. Since Thomastrip is made with extreme care throughout every operating procedure, it will meet your increasingly strict requirements. Thomas steel is uniform in high quality and meets specifications accurately. Not only is Thomastrip available in the usual chemical and physical properties, but also in a wide variety of electro-coated as well as hot tin coated finishes. Let Thomas engineers help you to plan your war production strategy. Write or send samples today.

THE THOMAS STEEL CO. . . WARREN, OHIO

Thomastrip

Bright Finish Not Coated, Hot Tin Coated, Electro Coated with Nickel, Zinc, Copper, Brass

SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

Dwindling Steel Warehouse Stocks Worry Eastern Manufacturers

NEW YORK

RAPID depletion of warehouse stocks in the East is concerning not only distributors, but manufacturers engaged in a wide range of war work. Some of the latter predict jobber stocks will be virtually exhausted before the year ends, and they believe that should this develop, war production will be crippled severely.

Even now, manufactures often must go far afield to obtain small items, and often at cost of considerable delay and effort. This in itself is not new. But it is the extent to which it is now being done, combined with the fact that not even this is going to help much longer at the rate warehouse stocks are shrinking, that is causing concern.

Due also to difficulty in obtaining steel, manufacturers are having to resort to an increasing number of substitutions—not only in the matter of sizes and analyses, but, in same cases, of changing over to entirely different materials. However, there are limits to which this can be done. Also, there is bound to be waste in time and materials, especially where over-size pieces are turned down or sheared to required size.

Stocks Important

While granting there is terrific demand for steel from many directions, manufacturers contend it is highly essential to them and to the war effort that there be stocks upon which they can draw for scattered items as the need arises. To carry all the sizes and specifications they might need in meeting every contingency of operation and maintenance would be poor economy, even if it were possible. At present, it would not only be poor, but outrageous economy, and obviously impossible. Yet stocks they can turn to for small special items (clearly needed for war work) are of more importance than ever before.

As indicated, many consumers are having to go far afield these days for such items. One large chain manufacturer recently had to go as far west as St. Louis to obtain 2½ tons of hot-rolled bars for an urgent Navy order taking an A-1-a rating. Such cases, he points out, are coming up practically every other day. Difficulty in obtaining steel has caused an eastern Pennsylvania interest, heavily engaged in war work, to call upon his branch offices in Baltimore, Boston, Chicago, Detroit, Houston, New York, New Haven, Philadelphia and St. Louis to assist in the procurement of steel. By this procedure practically all warehouses can be contacted as far west as St. Louis and as far south as Houston, Tex. But even with all this help this manufacturer is often required to ask the Army Ordnance Department for assistance in obtaining some items.

Incidentally, this particular purchaser summarizes his position by saying that before last winter he was successful in obtaining any quantity and size in commercial grades and all types of alloys from stock, but that today he can purchase practically no alloys from stock and finds the sizes and quantities of commercial grades limited. Frequently, his company is handicapped through inability to obtain stock from iron and steel distributors.

A chain manufacturer advises that for many years the steel warehouses have played a very important part in supplying his plants with

Long Shut-down Prevented
BY THERMIT WELDING
OF GIANT CRANKSHAFT

The breaking of this giant, eight-throw crankshaft (30' long by 10¼" in diameter) caused a complete shut down of the starch plant of a large refining company in Santa Domingo.

Even in ordinary times it would have taken from three to four months to replace the shaft, whereas the actual Thermit welding in our shop at Jersey City was done in a few days.

Write us for full particulars of Thermit welding, which has been standard practice for repair of heavy parts by steel mills and ship yards and many other industries for over 40 years.

Thermit welding is being used today, too, for the fabrication of heavy units. Simple forgings, small castings and flame-cut shapes can be welded together at a fraction of the cost of large, expensive castings. Preparation work is extremely simple and, compared with other welding processes, many valuable hours are frequently saved.

Booklet, Thermit Welding, sent on request.

Thermit welded crankshaft ready to be shipped.

Close-up of Thermit weld, which has the strength and soundness of forged steel.

THERMIT WELDING

Specialists in welding for nearly 40 years. Manufacturers of Murex Electrodes for arc welding and of Thermit for repair and fabrication of heavy parts.

METAL & THERMIT CORPORATION • 120 BROADWAY, NEW YORK, N. Y.
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numerous steel items. "Naturally," he says, "the large portion of our steel requirements is purchased from the mills; however, the small items of 500 or 1000-pound lots of cold-rolled steel, machine steel, black and galvanized sheets, etc., which we order both for production and maintenance, are no less important to our operations."

A turbine manufacturer is experiencing much difficuty in obtaining small steel and brass stock requirements from warehouses. "We always felt that the warehouse was a necessary unit in our commercial picture—more so now than ever, yet we have been given to understand that they are themselves experiencing the same kind of difficulties in obtaining their requirements in the various metals." This consumer hoped that something would be done and done quickly to insure the continued operation of warehouses.

A manufacturer of forging and pressing equipment in eastern Pennsylvania asserts that it has been his practice to buy, as much as possible, from the warehouses, as the quantities of steel ordinarily purchased do not warrant going direct to the steel mills. Up until the present, this company has been experiencing no particular difficulty, but is now encountering delay in obtaining certain sizes of cold-finished stock through inability of the warehouses to get material from the mills. As a result, the company is using substitute materials where quick delivery is essential.

A hydraulic turbine and valve manufacturer has been seriously handicapped in obtaining steel bar requirements. It has been necessary, frequently, for this company to accept substitute analyses or substitute sizes in order to keep abreast of production requirements.

On numerous occasions, this manufacturer has found it necessary to inquire many times for the same lot of steel before finally being successful in obtaining an acceptable quantity. There have been a number of requisitions which the company has been forced to carry along in its purchasing department for at least six months before finally being able to purchase all of the items required.

"Our situation here," says a company executive, "is such that only infrequently can we place mill orders for bars. We manufacture custom-built equipment and naturally the sizes cover a wide range. However, even with the wide range in sizes, our inquiries are always eagerly sought by the warehouses as attractive tonnage, miscellaneous lots often making 40,000 pounds carload.

Job Delayed a Year

"At present, we have several orders on mill books for a number of sizes of heavy flats, to which we had to extend various ratings, some of which were good and some not so good. We have received some of the items from the mills, but, as you can well appreciate, they are unable to ship the items on the lower ratings, and this has handicapped a job which we have had on our books for practically a year, due to the fact that we are unable to get several sizes of bars.

"Very frankly, in our opinion, we think that the warehouse as a source of service to the manufacturer engaged in this vital war program is a very essential unit and should be given consideration. A delay in receiving small stock items of bars very often seriously handicaps emergency war effort and we believe some relief should be given to the warehouses in order that they in turn can relieve a critical situation facing the manufacturers of war materials."

A manufacturer of electrical measuring instruments and pyrometers, etc., notes the increasing difficulty of distributors in obtaining stock replacements and believes this difficulty is going to work a

Spring Retainer Shaft
IT'S MADE OUT OF
SPEED CASE STEEL
A LOW CARBON OPEN HEARTH PRODUCT
–because . . .
It saved $37.50 per ton of steel used
It machined faster than SAE 1112
It increased tool life 45%
It riveted without fracture
Ductility
Plus
Machinability
(230 SFPM)
Speed Case will rivet • Bend cold 180° 1" Rd. C. D.
Machines at 230 SFPM • Very smooth finish
Excellent carburizing
In this "all-out" war effort Monarch Steel is co-operating 100%.
We're helping to "keep 'em rolling" with Speed Case Steel.
Licensor
MONARCH STEEL COMPANY
HAMMOND • INDIANAPOLIS • CHICAGO
PECKOVER'S LTD Toronto Canadian Distributor
Licensee for Eastern States
THE FITZSIMONS COMPANY
YOUNGSTOWN, OHIO
MANUFACTURERS OF COLD FINISHED CARBON AND ALLOY STEEL BARS

double hardship on plants such as his. "While we do use a considerable quantity of iron and steel products, we do not use such quantities as to order on every size the quantity required by a mill and wait for delivery."

A ball and roller bearings producer regards warehouse service as essential, not so much from a production standpoint, although his company does occasionally pick up small quantities of cold-rolled strip steel and low carbon bars when there is delay in shipment from the mills, but from a maintenance standpoint. The company continually is purchasing bars, shapes and sheets for this purpose.

Asserting steel warehouses are especially important at this time, an eastern Pennsylvania manufacturer, engaged in war work, points out that in many instances his company requires small quantities of steel bars, sheets, plates which are not sufficiently large to place with a mill, but which could easily be handled by a warehouse if they had the necessary material on hand.

"We are at the present operating on the basis of 95 per cent war work and frequently find that in connection with government contracts we require a few bars of hot-rolled material of special analysis and our only chance of filling our order is to pick up this material through a warehouse.

No Steel—Machine Redesigned

"Recently in connection with one of our government contracts we required approximately 1000 pounds of hot-rolled flat bars and after contacting seven warehouses by telephone in this locality we were unable to pick up the necessary material. It was then necessary for us to call all of our outside connections with the hope of picking up this material from some warehouse at a distant point, but inasmuch as we were not successful it was necessary to redesign the apparatus using other material.

"Our experience over the past several months has been that the steel warehouses in this vicinity have not been able to replenish their stocks; consequently, it is very difficult and sometimes impossible to obtain the small amount of material required in connection with special jobs."

A manufacturer of condensers special purpose compressors, big pumps and blast furnace blowers regards warehouse services as highly important. All his products are important to the war effort and in many cases urgently wanted for direct army and navy use. To complete this made-to-order machinery, bar stock, hexagons, flats, in some sizes are always needed in quantities far below those economical for the mills to roll.

Activities of Steel Users and Makers

Formation of a plant war production drive committee was announced last week by Herbert H. Pease, president, New Britain Machinery Co., New Britain, Conn. Feature of the plan is to increase attendance of company's 3500 employes through issuance of "perfect attendance awards." Program also includes a slogan contest, pledges of all-out efforts by workers, poster displays, progress indicators and supply to the men of informative pamphlets on war efforts.

•

Colonial Broach Co., Detroit, will soon double its broach manufacturing capacity in that city by occupying a new plant which is in addition to facilities created by the erection of its second plant in that location about a year ago. Area of the latter also is being increased 20 per cent, to be occupied by Colonial Bushings Inc. and New Method Steel Stamps Inc.

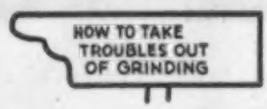
•

Orders received by General Electric Co., Schenectady, N. Y. in the

Check your needs for these products in
YOUR WAR WORK

AQUA SOL "D" GRINDING COMPOUND

This compound was particularly designed for micro finishing bearings, wrist pins, aircraft and engine parts. The most remarkable feature of this new grinding compound is its ability to settle fine chips; it does this faster and more completely than any compound or coolant we have ever seen.



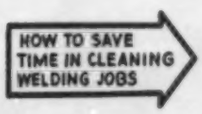
NO. 22 NON-SCRATCH DRAWING COMPOUND

No single compound or even a set of half a dozen will fit all purposes. We have, therefore, made many brands to fit different working conditions and preferences. In 1917 we developed the first washable-in-water compound that ever had been offered; today we are always pleased to supply working samples and servicemen for demonstration purposes. We also work out special lubricants for special jobs.

NO-SEP LUBRICANT

This lubricant is known as "the lubricant that lengthens the life of tools". If you have difficulty in maintaining limits in tapping or threading jobs, find excessive wear or breakage of taps or tools, try NO-SEP. It is widely used in war plants for broaching, drilling, boring and other cutting operations on hardened, toughened steels.

SPATTER-EX AND FLASH-EX



Spatter-EX prevents the bonding of welding spatter to parts which are to be welded. Flash-EX protects welding holder jaws from becoming jammed with flash; prevents adhesion of welding spatter on multi-pass welds, or on single welds where the heat is intense. Both compounds are water-soluble.

PROTEX NON-RUST OILS BEAT CORROSION!

Ideal for protecting shipments and exports against rust damage. Extensively used on steel stocks, machines, parts, tools, dies, etc. which must be placed in storage. For a few months' protection, use No. 20 Protex Non-Rust Oil; for long storage, use our F.B. Protex.

MELTOMATIC PASTE SOLDER

Brush the material on, apply heat, and wipe. It's a revolutionary process; saves time.

ALUMINUM CUTTING OIL

Has great penetrating power, plus ample lubrication; increases tool life.

B CEMENT FLOOR CLEANER

For maintaining factory cleanliness; excellent for oil-soaked floors; cleans in a jiffy.

WAYNE CHEMICAL PRODUCTS CO.

Dependable Service to the Metal Working Industries for over 25 years

9502 COPELAND ST.

DETROIT, MICHIGAN

second quarter of 1942 amounted to $566,250,000, an increase of 115 per cent over the corresponding period of last year, Charles E. Wilson, president, reported last week. Orders for the six months ending June 30 totaled $865,370,000, an increase of 66 per cent.

♦

For outstanding achievement in production of equipment vital to the United States Navy, the Navy "E" burgee, symbol of "Work Well Done", was presented to the De Laval Steam Turbine Co., Trenton, N. J., June 29, at which time also the employes received the "E" lapel insignia. Production of equipment for the Navy by the company during the first four months of 1942 exceeded in equivalent man hours its entire production during World War I.

♦

A. Jay Hofmann has moved to larger quarters at 31 North Narberth avenue, Narberth, Pa. In addition to cranes and mill equipment the organization will handle compressors, diesels, steel buildings and contractors' equipment, under direction of Frank W. Hofmann, and liquidation of idle tonnages of new and used steel, steel tanks and towers and general surplus materials, under direction of E. L. Hofmann.

♦

Due to increased industrial activity in the Northwest and the need for greater sales coverage in that area, Cutler-Hammer Inc., Milwaukee, has elevated its Seattle office to the status of district sales office. T. N. Bristow, of the Seattle office, assumes the title of district manager.

♦

With testimonials of esteem in recognition of their accomplishments, 206 veteran employes of Lincoln Electric Co., Cleveland, who had served 10 to 35 years, recently received service pins from company officials.

♦

Machine Tool Builders Appoint Eastern Agents

More machine tool manufacturers who formerly were represented in New York and New England by Henry Prentiss & Co., sales agency which retired from business May 31, have announced appointment of new representatives.

Blanchard Machine Co., Cambridge, Mass. and Racine Tool & Machine Co., Racine, Wis., will be served in the Syracuse, N. Y. district by C. H. Briggs Machinery Co. of that city. George Keller Machinery Co. will represent both firms in the Buffalo district.

In New York city and vicinity, Rudel Machinery Co. will handle the Racine line. No change is made in the latter's New England sales area, where it is represented by Wigglesworth Machinery Co., Cambridge, Mass., and Lynd-Farquhar Co., Boston.

Making Fiber Containers On Tin-Can Machines

Process developed by the American Can Co., New York for making cans of fiber bodies on machines normally used for manufacture of metal containers was announced last week. It will be made available to the canning industry for the duration when perfected through actual production. It is expected to find ready acceptance by manufacturers of dry-pack products.

Under the new method fiber is cut to sheets of tin plate size, lithographed on presses formerly used for reproducing designs on tinplate, then sheared and formed into bodies. Ends will be seamed on the container with the machines now in use.

Greatest merit of the process, according to company, is that no new machinery is required.

AVOID DELAY
IN FURNACE CONSTRUCTION
Use Refractory Concrete!

...It is available and adaptable

YOU can get the materials for Refractory Concrete and Refractory *Insulating* Concrete *now*—or whenever you want them. Refractory Concrete is made with LUMNITE as the binder for refractory aggregates. LUMNITE is sold by building supply dealers throughout the United States and in Canada. Aggregates *can be easily obtained or prepared in your plant.*

Added to availability is the adaptability of Refractory Concrete and Refractory *Insulating* Concrete. *This also eliminates delay.* Cast-in-place Refractory Concrete is formed to fit the job. Any thickness or shape of wall or arch can be placed without limitation by the size of masonry units, without cutting, and without waiting for special shapes.

High cold-strength speeds up the construction schedule. Refractory Concrete is ready for service in short order, usually before installation of burners and accessories is completed. *You do not have to wait for Refractory Concrete.*

Pre-cast units of Refractory Concrete can be made in your plant, ready for installation as needed. Special shapes, made in any form desired, can be stored or installed the day after molding—without pre-firing.

Let us tell you where you can get LUMNITE and aggregates for Refractory Concrete and Refractory *Insulating* Concrete. Write The Atlas LUMNITE Cement Company (United States Steel Corp. Subsidiary), Dept. S, Chrysler Building, New York City.

Keep LUMNITE Castables in Stock—
if you prefer a factory-prepared mixture. Made with LUMNITE and selected aggregates, these castables are ready for use upon mixing with water. With LUMNITE castables you can have Refractory Concrete or Refractory Insulating Concrete in minimum time. LUMNITE Castables are obtainable from refractory manufacturers and distributors in all parts of the United States and Canada.

▶ Specify Castables "Made with LUMNITE" ◀

LUMNITE FOR REFRACTORY CONCRETE

"Techni"
PROCESS ROLLS

Other Mackintosh-Hemphill Products:

Rolling Machinery

Shape Straighteners

Strip Coilers

Shears

Levellers

Pinions

Special Equipment

Iron-Steel Castings

The NEW Abramsen Straightener

Improved Johnston Patented Corrugated Cinder Pots and Supports

Heavy Duty Engine Lathes

More tons and lower cost per ton rolled; less slippage; greater bite; better surface and resistance to fire cracking—these are the profit making advantages you get with "TECHNI" Process Blooming and Slabbing Mill Rolls. These extra qualities are made possible by the "TECHNI" Process, an exclusive development of Mackintosh-Hemphill, which regulates the quality and grain size of the rolls with as much exactness as the best modern steel practice regulates the quality of steel.

Make your next set of rolls "TECHNI" Process.

Since 1803—Pioneers, Engineers and Builders

MACKINTOSH-HEMPHILL COMPANY . . . Pittsburgh and Midland, Pennsylvania

The Rolls With The Red Wabblers
They Roll More Tons Per Dressing

Steel and Alloy Steel Rolls

FOR BLOOMING AND SLABBING MILLS

WHEN America has paid the price . . . in full.

In blood, yes . . . in tears, and in SWEAT! We free people have always been ready to toil for our pleasures. Now, we must sweat for Victory!

The men of Cooper-Bessemer realize that Victory means hard work . . . long hours . . . maximum effort. Since Pearl Harbor, production of engines and compressors has been stepped up twice, is being nearly doubled again. Every man wants to make good engines better, make better engines faster.

Today, there's a quicker tempo, with grim determination to do the job . . . to pay the price of Victory . . . NOW!

THE COOPER-BESSEMER CORPORATION
Mount Vernon, Ohio
Plants at Mount Vernon, Ohio, and Grove City, Pa.

A typical 8-cylinder direct-reversing Cooper-Bessemer Marine Diesel Engine

Cooper-Bessemer
Engine Builders for 5 Victories Since 1833

Signs "Final Pact"

(*Concluded from page 44*)

deeply regret circumstances are such that the Amalgamated Association, with its fine traditions, is passing out of the picture."

The letter pledged the company future co-operation with the new union in the same spirit. Of the 7000 members of the Amalgamated Association 1500 are employes of the Granite City Steel Co.

The new contract will be binding on the new union. It provides for a continuation of the previous rates of pay, with compensation for increased living costs to be negotiated later. Union representatives who signed this contract included grandsons of the signers of the original union contract with the company.

War Department Asks for Check Up on Steel Employes

PITTSBURGH

Investigation of all employes of Pittsburgh district steel companies, "from top executives to bottom-rank workers," was ordered last week by the War Department at a meeting attended by steel men and leaders of the CIO and AF of L unions. Purpose is to prevent sabotage or other efforts to reduce production.

Capt. Richard Brown, United States Army, told industrialists that the investigation into private lives of all concerned must be begun within ten days or their war contracts will be re-negotiated and a definite clause inserted to insure execution of the order. Labor representatives were told that government would not stand for interference from any source.

(Additional labor news will be found on page 66.)

"Aluminum Forgings for WPB" in Old Tin Mill

Carnegie-Illinois Steel Corp.'s Shenango tin plate plant at New Castle, Pa., will be taken over by the WPB and will be converted into an aluminum forging plant, Senator Joseph Guffey, Pennsylvania, announced in Washington last week.

Twelve large forging presses will be installed and about 2000 workmen employed, according to the senator. Considerable of the labor force displaced when the tin mills discontinued operations will be absorbed in the plant.

The forging presses will occupy space now occupied by 40 hot tin mills; Shenango's finishing mills still are in operation.

No date was given for starting or completing the conversion.

The tin mill plant suspended on June 13 because of inability to obtain sufficient tin and steel. Only ten mills were operating when the plant closed.

Canada Has Spent Five Billions on War Production

TORONTO, ONT.

VALUE of Canadian contracts and commitments on dominion, United Kingdom and other accounts to the end of June totaled almost $5,000,000,000, according to a report by C. D. Howe, minister.

Preliminary figures show that for the period from July 14, 1939, to June 30, 1942, the total was $4,877,063,532. Contracts placed on Canadian account, including plants and extensions, part of which is chargeable to other Empire countries under the air training plan, general purchases and contracts totaling $36,350,004 awarded by the Civilian Aviation division of the Department of Transport, totaled $2,453,698,533. Aggregate orders for stores placed on United Kingdom account, with United Kingdom commitments for plants, extensions and orders for output of some of these plants amounted to $2,046,646,193, an esti-

We want to help you BEAT YOUR BEST RECORDS!

Increase the upward swing of your production curve by adding Scaife Company's production facilities to your own!

Two roads are open—(1) release your own factory equipment for war production by letting Scaife make your cylinders, tanks, etc. (2) sub-contract to Scaife, manufacturing operations involving:

★ Arc Welding—hand, automatic or semi-automatic
★ Brazing, Spot Welding ★ Pressure Testing
★ Drilling and Tapping ★ Drawing and Stamping
★ Hot Dip Galvanizing ★ Hot or Cold Riveting

Send your blueprints for quotations.

SCAIFE COMPANY
General Offices and Works: OAKMONT (Pittsburgh District), PA.
REPRESENTATIVES IN PRINCIPAL CITIES

mated figure, which includes the United Kingdom's share in joint projects. Contracts awarded on other accounts totaled $340,368,802.

Nearly 335,000 contracts have been placed on Canadian account by the department and its predecessors, with average value of $7300. The peak for such awards was reached in the quarter ending June 30, 1942, with a monthly average of 18,029, compared with 13,214 in the same period in 1941 and 4048 in the corresponding quarter in 1940.

Contracts placed on Canadian account include: Aircraft, $420,248,713; alloys and metals, $9,248,201; construction and defense projects, $224,610,982; land transport, $227,813,638; machinery, $21,235,613; munitions,, $72,927,512; ordnance, $211,644,079; shipbuilding, $437,369,973.

Canadian iron and steel imports in April were valued at $37,160,000, compared with $37,914,000 in April, 1941. Vehicles represented the largest value, $8,794,000. Other imports included rolling mill products, $8,614,000; machinery, except agricultural, $7,332,000; farm implements, $2,732,000: engines and boilers, $1,545,000; pig, ingots, blooms and billets, $1,038,000.

The Canadian government has ordered a census of all used industrial, construction and road maintenance machinery, to be completed by the end of July. Owner of equipment which is idle or used in nonessential work may be required to sell or rent it.

Department of Munitions and Supply has issued an order prohibiting sale or purchase of cast iron pipe except under permit. Sellers are instructed to refuse to sell to anyone suspected of using the pipe for other than repairs.

Dominion Bureau of Statistics reports that during May 30,000 tons was added to Canadian steel productive capacity and other additions will come into production this summer. Ingot and castings capacity added since Jan. 1 aggregates 104,000 tons. Total rated annual steelmaking capacity, open-hearth, bessemer and electric furnace, now is 3,268,000 net tons, almost 1,000,000 tons increase from 2,300,000 tons available at the end of 1939.

Steel Co. of Canada Ltd., Hamilton, Ont., will add six buildings to its plant, costing, with equipment, $2,775,000. This includes a bessemer and an electric furnace plant. The main building will be 75 x 300 feet, bottom ovens building 20 x 75 feet, blower building 20 x 75 feet, bottom house 70 x 150 feet and electric furnace building 70 x 75 feet. Equipment will include a bessemer converter, hot metal mixer, 60-ton Heroult electric furnace, three cranes and auxiliaries.

THERE IS NO SUBSTITUTE FOR EXPERIENCE

Over 24 years of effort in the specialized field of heat- and corrosion-resistant alloy castings have given MICHIANA experience covering the widest diversity of application. To this long practical experience MICHIANA has the specialized metallurgical engineering skill, modern facilities, and trained foundrymen to insure uniformity of quality in alloy castings needed to meet the present day demands for greater production. MICHIANA alloys are doing their part in the heat treating required to develop maximum properties in materials for machine tools and war equipment, and are performing vital functions in connection with the furnaces and handling of work through these furnaces.

MICHIANA experience is at your service at all times.

MICHIANA PRODUCTS CORP.
Michigan City, Indiana

Recovery Corp. To Thaw Frozen Steel Into War Channels

NEW YORK

STEEL Recovery Corp., financed by Reconstruction Finance Corp., is being set up to speed flow of frozen inventories into war work.

Prominent members of the steel industry are to be members of the board of directors and an experienced steel man is to be elected president and general manager.

Steel Recovery Corp. will be similar in structure and functions to the Copper Recovery Corp., or CRC, which has just completed its first 15 days of operations. CRC has asked 105,000 companies to report their surplus stocks of copper. It is now tabulating this information, trying to find buyers for material "as is," and buying up the balance at subsidy prices for scrapping.

SRC, Steel Recovery Corp., is to

be organized with assistance of WPB's Inventory and Requisitioning Branch. It probably will be the clearing agency and fiscal agent for the government. If the procedure of CRC is followed there will be two divisions, Inventory and Requisition, which are responsible for assembling information on frozen stocks, and WPB's Iron and Steel Branch, which will decide how much material can be used "as is" and how much must be bought at subsidy prices and scrapped.

Officers and members of the board, location of the office and operating details on SRC are expected to be announced soon.

In its first progress report it is disclosed that CRC has directed 500 tons of copper and copper alloy products from frozen inventories into war work. Ernest A. Tupper, chief, Inventory and Requisitioning Branch, WPB, stated last week that "by the end of the week over 1000 tons of idle and excessive inventories of copper will be flowing weekly directly and indirectly into production of munitions, tanks, planes and ships, as the result of voluntary sales by industry, with the WPB acting only as a clearing house."

Mr. Tupper also said "WPB and the CRC, acting as agent of Metals Reserve Co., an RFC corporation, originally expected to pick up over a half billion pounds of copper and brass. However, as a result of the issuance of priorities regulation No. 13, which permits the movement of frozen inventories under certain circumstances to specified buyers, it is now believed that as much as 150,000,000 pounds of copper will find its way into war production without further government assistance."

Mirrors of Motordom

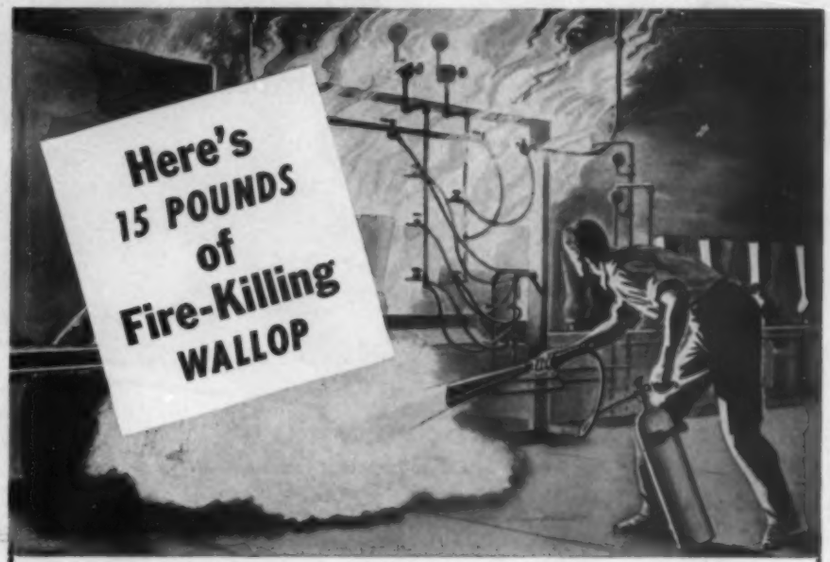
(*Concluded from Page* 60)

ice in various government departments.

Mr. Nathan made one interesting observation, to the effect that the salvation of thousands of small businesses this fall rests with the success of the new Smaller War Plants Corp. He indicated that unless this new agency does a good job, many of these small plants face bankruptcy, but that efficient administration of the SWPC could "use" these plants in the overall war effort, instead of merely trying to "save" them.

The Automotive Council for War Production is becoming an increasingly potent instrument in the furtherance of war production among plants in the automotive industries —and this includes several hundred of the parts manufacturers as well as the former automobile and truck builders. The council's personnel is being expanded steadily and new services instituted. One of the latest is a confidential bulletin of technical progress in war production which will be circulated throughout the industry, giving tips on how one plant or one group has perfected some technical innovation to speed their effort, and thus making the information available to all. A former local editor for a leading trade magazine has been hired for this task.

It is interesting to speculate on what the eventual course of this complex war council of the motor industries will be. Normally one would expect it to disband with the cessation of war and revert to the former Automobile Manufacturers Association. But the strong possibility is seen of the group continuing as a means of demonstrating how an aggressive industry can function independently of government aid, or "domination" if you care to use the word. In effect, the council conceivably could be a weapon for combatting "federalization" of the automobile industry if, as many insist, the prospects are for nationalization of all industry under some form of state capitalism following this prodigious war effort. In any event, the course of the automotive council in the years ahead will bear watching.



...FOR FLAMING LIQUIDS, ELECTRICAL FIRES

Different fires need different extinguishing methods. For example, we don't tell you to use Kidde extinguishers on paper and rubbish fires. That's not their main job, although they often do it.

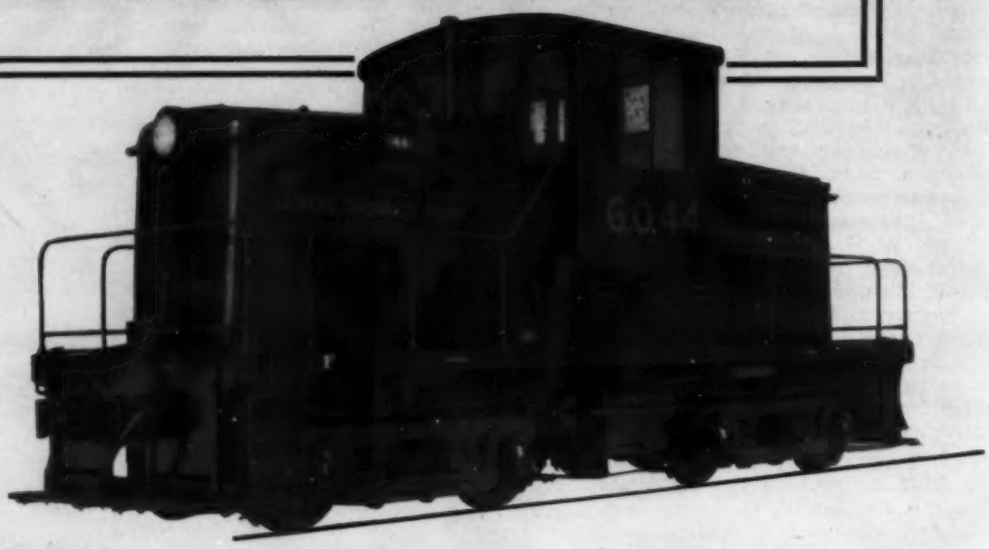
The real fire fighting job of Kidde extinguishers is killing electrical and flammable liquid fires. These fires need *smothering*. Kidde blankets them in a fast-expanding blizzard of carbon dioxide snow-and-gas, one of the fastest of all known extinguishing agents, clean, dry and non-contaminating.

The Kidde fifteen-pounder shown in the illustration carries a heavy punch against industry's toughest fires. If you're protecting flammable liquids or electrical equipment, here's your fire fighter. Its 15 lbs. of carbon dioxide give it ample hitting power to knock down blazes that baffle ordinary extinguishers. That's why it's industry's favorite among all Kidde models!

Kidde SNUFFS OUT FIRE

Kidde Walter Kidde & Company Incorporated
732 West Street Bloomfield, N. J.

WHITCOMB LOCOMOTIVES



In the battle of production, there is no retreat

America is so completely committed to the struggle for survival as a free nation that any lagging looms in the light of a major disaster. But there is no lagging when WHITCOMB DIESEL LOCOMOTIVES are on the job. They are always ready for action and are mighty easy to handle. The WHITCOMB LOCOMOTIVE has the power to move more tonnage faster—helping to step up production schedules. The ruggedness to stay on the job in the toughest kind of service—preventing loss of valuable time. Operating economy beyond fondest expectations—reducing costs to a minimum. These are some of the advantages Whitcomb owners are praising. Send for descriptive literature and learn how WHITCOMB can help you in the battle of production.

DIESEL or GASOLINE POWER — MECHANICAL, HYDRAULIC, or ELECTRIC DRIVE

BLW THE BALDWIN GROUP

THE WHITCOMB LOCOMOTIVE CO.

ROCHELLE, ILL.

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

MARKET SUMMARY

DEMAND

Increasing pressure for deliveries for war purposes at high ratings.

PRODUCTION

Advanced ½ point to 98 per cent of capacity.

PRICES

Ceiling levels govern in all iron and steel products.

Steel Output Meets Heavy War Needs

Scrap situation disquieting as probability of reserves for winter use fades . . . Shape output at record in June . . . Ship program calls for added tonnage . . . Sheet mills seek orders to keep busy

ALL efforts of the steel industry are centered on supplying requirements for war production, which are on the increase.

Output is holding as near capacity as conditions will permit and deliveries are being strictly supervised by the War Production Board. Changes in ratings are frequent in the effort to meet insistent needs first, resulting in frequent changes in rolling schedules. Close control of inventories has prevented accumulations by some consumers while others had insufficient supply. In general, not more than 45 days stock is being allowed and in most cases much less. Increased demand is pushing ratings progressively higher and allocations cover the greater portion of orders.

The most disquieting feature of the situation is practical certainty of insufficient scrap supply next winter, indications already appearing. Some observers believe the pinch will be felt as early as October. Current consumption to sustain near-peak steel output is using all available tonnage and insufficient reserves will be accumulated. Already melters who had been able to lay down some stocks are using them to maintain production. Results of the nationwide campaign for salvage are awaited with utmost interest. Many predictions are made that they will be disappointing. Meanwhile some reliance is being placed in expected larger pig iron supply to replace missing scrap. Additional blast furnaces will be in service later in the year and practically all are exceeding rated capacity.

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Pig iron distribution is well stabilized and varies from month to month only as war contracts are more widely distributed. Large reserves existing early in the year have been liquidated and distribution is closely geared to consumption.

Structural steel fabricators, losing much work by curtailment of building construction, are turning to subcontracting on products for which their equipment is suited. Lighters, barges and pontons are among products they have taken over in quantity and numerous assemblies for shipbuilding are being made in fabricating shops. Shape requirements for the Maritime Commission's Liberty ship program will total 1,500,000 tons and plates 6,500,000 tons. War Production Board reports a new peak in production of structural shapes in June, shipments being 481,182 tons, the previous high during the war era being 451,000 tons in November. A large part of this total was for shipbuilding.

Better plate distribution is being achieved and top-heavy shipyard inventories have been reduced, the effort now being to maintain a level of 45 to 60 days supply. Some mills are falling behind schedule, part of June tonnage being delivered in first half of July. Shipbuilding demand is causing plates to be shipped from remote producing centers, some being supplied to New England shipyards from mills at Birmingham, Ala.

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Steelworks operations last week advanced ½-point to 98 per cent of capacity. Only scarcity of scrap and necessity for furnace repairs prevented a higher rate. Chicago broke its declining trend and rose ½-point to 102 per cent. Buffalo regained 2½ points to 93 per cent, Wheeling advanced 6 points to 83½ and Youngstown was up 1 point to 96. Cincinnati lost 3½ points to 88½ per cent, Cleveland ½-point to 94½, New England 2 points to 90, Detroit 4 points to 85 and Pittsburgh 1 point to 94 per cent. Rates were unchanged at St. Louis, 95½; Birmingham, 95; eastern Pennsylvania, 96.

Steel bar deliveries continue to lengthen and producers are loaded heavily with directives in the effort to keep up supply for most essential needs. This requires frequent revision of ratings. Deliveries on cold-rolled bars vary widely, recent bids on a Navy inquiry developing a range of 90 to 240 days. Promises on high-rated alloy bars reach into first quarter. Some SAE grades are being automatically changed to NE specifications.

Composite iron and steel prices are unchanged, governed by price ceilings. Finished steel composite is $56.73, semifinished steel $36.00, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	July 18	July 11	July 4	One Month Ago June, 1942	Three Months Ago April, 1942	One Year Ago July, 1941	Five Years Ago July, 1937
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.18
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	22.84
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	18.70

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	July 18, 1942	June 1942	Apr. 1942	July 1941
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.49	2.49	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.22	2.22	2.27
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to $\frac{5}{16}$-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	July 18, 1942	June 1942	Apr. 1942	July 1941
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$25.34
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.39	25.39	25.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	24.06
No. 2X, del. Phila. (differ. av.)	26.215	26.265	26.265	26.215
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	125.63	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	17.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	21.50

Coke

Connellsville, furnace, ovens	$6.00	$6.00	$6.00	$6.25
Connellsville, foundry, ovens	7.25	7.25	7.25	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942 The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh base, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bll.) $36.00.
(Wheeling Steel Corp. allocated 21,000 tons 2" square, base grade rerolling billets under lease-lend during first quarter 1942 at $37, f.o.b. Portsmouth, O.; Andrews Steel Co. may quote carbon steel slabs $41 gross ton at established basing points.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34.00.
(Empire Sheet & Tin Plate Co., Mansfield, O. may quote carbon steel sheet bars at $39 gross ton, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.
Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10 Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c Pac. ports, dock 2.50c; all rail 3.25c.
(Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.) Joslyn Mfg. Co. may quote 2.35c, Chicago base.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c Detroit, del. 2.82c.

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	5100 Spr. flats	0.15
2100	0.75	5100 80-1.10 Cr	0.15
2300	1.70	6100 Bars	1.20
2500	2.55	6100 Spr. flats	0.85
3100	0.70	Carb., Van.	0.85
3200	1.35	9200 Spr. flats	0.15
3300	3.80	9200 Spr. rounds, squares	0.40
3400	3.20	T 1300, Mn, mean	
4100 .15-25 Mo. 46.00 .20-.30 Mo. 1.50-2.00; Ni	0.55 1.20	1.51-2.00	0.10
		Do., carbon under 0.20 max.	0.35

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.27c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports, 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c Phila del. 3.68c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)
Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.
Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.
Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.
Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.
Manufacturing Ternes: Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.
Roofing Ternes: Pittsburgh base per package 112 sheets, 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.
(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. may quote plates at 2.20c, f.o.b. basing points.)
Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.
Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points.)
Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c
Wire Products to the Trade:	
Standard and cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	67
Do., 11 gage and heavier	70
Barbed wire, 80-rod spool, col.	70
Twisted barbless wire, col.	70
Single loop bale ties, col.	59
Fence posts, carloads, col.	69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

	Steel Blk.	Steel Galv.		Iron Blk.	Iron Galv.
In.			In.		
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

	Steel Blk.	Steel Galv.		Iron Blk.	Iron Galv.
In.			In.		
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.46	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.
High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	..	67.00c
18.00	4	2	1	77.00c
18.00	4	3	1	87.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
*317	50.00	54.00	58.00	50.00	58.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	‡‡18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. ‡‡Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.
Extras mean additions or deductions from base prices in effect April 16, 1941.
Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.
Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin of shipment.
Dislocated tonnage: Producers shipping material outside their usual marketing areas because of the war emergency may charge the basing point price nearest place of production plus actual cost of transportation to destination.
Seconds or off-grade iron or steel products cannot be sold at delivered prices exceeding those applying to material of prime quality.
Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941. Domestic or export extras may be used in case of Lease-Lend tonnage.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅝ and ⅞ x 6-in. and shorter	63½ off
Do., ⅝ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅞-inch and less	62	64
⅛-1-inch	59	60
1⅛-1⅛-inch	57	58
1⅛ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo 2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
½-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens	
Connellsville, furnace	$6.00
Connellsville, foundry	7.00- 7.50
Connellsville prem. fdry.	7.25- 7.60
New River, foundry	8.00- 8.25
Wise county, foundry	7.50
Wise county, furnace	6.50
By-Product Foundry	
Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do. less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls. to jobbers	6.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.00

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.65	.....	.....	28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.67	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	‡24.47	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.24	.....	.....	.....
Philadelphia, del.	25.51	25.01	.....	.....
St. Louis, del.	‡24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	.....	.....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	.....	25.00	24.50
St. Paul, del.	26.76	.....	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	.....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
‡Pittsburgh, del., No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	.....	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	.....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. ‖For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn.	$28.00
Chicago, del.	31.54

Southern

Semi-cold blast, high phos, f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$23.50
Valley, base	23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorous Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942.

Export Prices: In case of exports only, the governing basing point nearest point of production may be used, plus differentials and export transportation charges.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick	
Super Quality	
Pa., Mo., Ky.	$64.60
First Quality	
Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00
Second Quality	
Pa., Ill., Md., Mo., Ky.	46.55
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00
Malleable Bung Brick	
All bases	$59.85
Silica Brick	
Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30
Ladle Brick	
(Pa., O., W. Va., Mo.)	
Dry press	$31.00
Wire cut	29.00
Magnesite	
Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Basic Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$23.00-25.00
Do., barge	23.00-25.00
No. 2 lump	23.00-25.00

(OPA May 11 established maximum at Jan. 2, 1942, level.)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.50c; packed 5.75c; ton lots 6.00c; less-ton lots 6.25c; less 200-lb. lots 6.50c. Spot prices ¼-cent higher.

Electrolytic manganese: 99.9% plus, less carlots, per lb. 42.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	22.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers' plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $128; ton lots $140.50. Spot $5 per ton higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.55-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot 5 cents per lb. higher.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%. Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producer's plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents per pound higher.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.50c; ton lots

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1942

	Soft Bars	Hot-rolled Strip Bands	Hot-rolled Strip Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.68	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.04	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.92	3.45	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.50	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.38	4.23	4.98	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Chattanooga*	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	5.25	5.00	4.60	....	....
Houston, Tex.	3.75	4.30	4.30	4.05	4.05	5.50	4.00	....	5.25	....	6.90	....	....
Seattle	4.20	4.25	5.45	4.75	4.45	6.50	4.65	7.60	5.70	....	5.75	....	....
Los Angeles	4.50	4.95	6.80	4.50	4.50	6.75	4.65	6.50	5.85	....	6.10	10.55	9.55
San Francisco	3.95	4.50	6.25	4.65	4.35	6.35	4.55	6.40	6.10	....	6.80	10.80	9.80

*Not named in OPA price order.

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.25	....	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	8.80
San Francisco	5.45	9.80	8.80	8.65	9.05

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in B'ham., Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore: 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities, New Orleans; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-10,000 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia: 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 500-999, Los Angeles, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b. U.K. Ports	L	s	d
Merchant bars, 3-inch and over	$66.50	16	10	0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20	0	0
Structural shapes	2.95c	15	10	0
Ship plates	2.90c	16	2	6
Boiler plates	3.17c	17	12	6
Sheets, black, 24 gage	4.00c	22	5	0
Sheets, galvanized, corrugated, 24 gage	4.61c	25	12	6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.20	1	10	9

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

	L	s	d
Foundry No. 3 Pig Iron, Silicon 2.50-3.00	$25.79	6	8 0(a)
Basic pig iron	24.28	6	0 6(a)
Furnace coke, f.o.t. ovens	7.56	1	17 6
Billets, basic soft, 100-ton lots and over	49.37	12	5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14	10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17	12 0††
Shapes	2.77c	15	8 0††
Ship plates	2.91c	16	3 0††
Boiler plates	3.06c	17	0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22	15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26	2
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23	15 0
Bands and strips, hot-rolled	3.30c	18	7 0

(a) del. Middlesbrough. 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi bessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	12.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

Gross ton c.i.f. Baltimore; dry basis; subject to penalties for guarantees

Indian and African, 2.8:1 lump, 48%	$39.00
South African (excluding war risk)	
No ratio lump, 44%	28.00
Do. 43%	29.00
Do. 48%	34.00
Do. concentrates, 48%	33.00
Do. 50%	34.00
Brazilian (nominal)	
2.5:1 lump, 44%	28.50
3:1 lump, 48%	38.00

Manganese Ore

(Nominal)

Including war risk but not duty, cents per unit cargo lots

Caucasian, 50-52%	
S. African, 48%	80.00-86.00
Indian, 50%	80.00-86.00
Brazilian, 46%	78.00-84.00
Cuban, 51%, duty free	85.00
Domestic, 48%, f.o.b. mines	$1.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

				ELECTRIC FURNACE AND FOUNDRY GRADES										
				Low Phos. Grades										
	OPEN HEARTH GRADES*	Machine Shop Turnings	BLAST FURNACE GRADES*	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	Cut Auto Scrap 3 ft. and less	Cut Auto Scrap 2 ft. and less	Cut Auto Scrap 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$16.00	$16.00	$25.00	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Bethlehem	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Buffalo	19.25	15.25	15.25	24.25	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Detroit	17.85	13.85	13.85	22.85	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Kokomo	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth	18.00	14.00	14.00	23.00	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
St. Louis	17.50	13.50	13.50	22.50	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	13.00	13.00	22.00	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle	14.50	10.50	10.50	19.50	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	21.00	22.00	23.50	24.00	24.25	24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	17.50	18.50	19.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

***Open Hearth Grades** refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, tube scrap $3 over, auto springs, crankshafts, $1 over No. 1 heavy melting. **Blast Furnace Grades** refer to mixed borings and turnings, shoveling turnings, No. 2 busheling and cast iron borings.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, provided most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $2.50 less (railroad grades $3.50 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Graveyard autos not considered unprepared scrap.

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

Sheets, Strip

Sheet & Strip Prices, Page 116

Including allocations there are nine ratings ahead of A-1-a tonnage under the revised priority setup, which renders the system ineffective as operated in the past, forcing re-adjustments on strictly rated volume, which dwindled steadily as directives and allocations rise. While some outstanding tonnages of sheets are being placed for war work, notably for drum sheets, overall consumption is declining. On the whole, fewer directives are being applied to sheet deliveries than on some products, but top rating is required to assure supplies of semifinished for rolling. Delivery promises on A-1-a orders are being withdrawn and directives operate in fact as a frozen delivery promise, which may be applied to low ratings, A-2 or lower, if the importance of the order warrants after review. There is no lack of inquiry for all finishes of sheets, distribution as to end use, geared to war production and limited output, being the main problem.

Sheet production is declining and some producers are competing for both hot and cold-rolled carbon material carrying high ratings, to obtain allocation of semifinished to engage idle capacity on sheet mills. This tonnage is limited and six to eight weeks delivery is promised on both hot and cold-rolled.

Galvanized sheets are especially tight, restricted by lower-rated requirements for building and regulations curtailing use. A recent sheet purchase in the East involves 1000 tons for chemical bombs.

Frozen stocks of steel which must be liquidated are much lower in New England than in most districts, but included a substantial tonnage of stainless sheets originally purchased for fabrication of soft drink container-coolers, which has been resold.

Orders for narrow cold steel strip have slackened thus far this month with shipments above bookings. Rerollers have heavy backlogs on which specifications tend to increase each month, numerous fabricators, having equipped for war production, now getting into heavy production. This tends to lift cold strip specifications, although some fabricators have difficulty in getting dies and other new units. Adequate supply of hot strip is a major difficulty with rerollers, only top ratings being of value. Backlogs and bookings also run heavily to high carbon and alloys, although demand for stainless lags; numerous substitutions are being made for stainless, even for war requirements, and producers of this grade are not heavily booked.

Plates

Plate Prices, Page 117

Plate allocations are broadening as fabricating shops take on an increasing volume of war work as subcontractors. Other plate consumers are increasing consumption. A substantial portion of miscellaneous production is related to shipbuilding. Deliveries to shipyards are better balanced, some of the heavier inventories having been lowered, and the effort is being made to maintain stocks at 45 to 60 days requirements. On the whole, shipyard requirements are as heavy as ever, additional shipways bringing further demand. Liberty ships for the Maritime Commission will require about 6,500,000 tons of plates and 1,500,000 tons of shapes.

Some producers carried June deliveries over to the middle of July, as May deliveries in some cases absorbed full production through June. Sheared plates are delayed more than universal, the latter being somewhat easier while sheared mills are pressed.

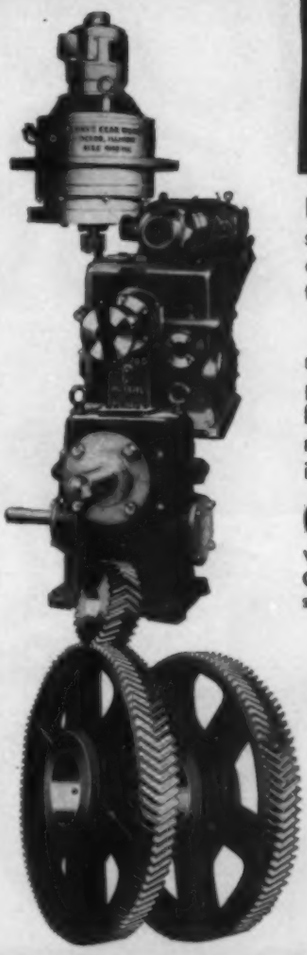
Heavy demand is resulting in dislocated tonnage deliveries in the effort to meet requirements. Plates are being shipped to New England shipyards from as far away as Birmingham, Ala.

Bars

Bar Prices, Page 116

Bar mill books are heavily loaded with directives and revision of ratings is frequent to assure shipment of more important war tonnage. Deliveries continue to lengthen. Some mills now are taking new business on both hot and cold-rolled carbon bars on directives only and some producers can make better shipment on bessemer than open hearth. Wide difference on cold-rolled delivery was noted in recent bids on 700 tons for a navy yard,

Brad Foote



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SPEED REDUCERS

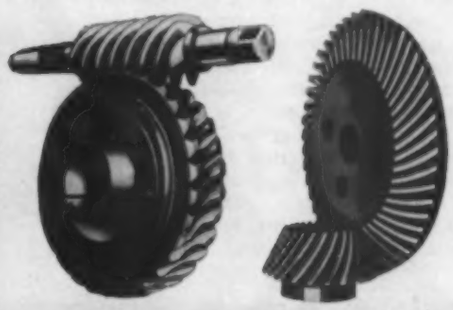
Brad Foote products, special cut gears and speed reducers are turning the wheels in every conceivable industry manufacturing the material so urgently needed today.

Their uninterrupted performance, the many years of specialized research, experience in speed reduction gear manufacture and unusual plant facilities have made this organization one of the most important of its kind.

GEARS IMMEDIATE SHIPMENT

We have on hand subject to prior sale, Spur, Change, Bevel, Mitre, Worm & Worm Gears in sizes 3 to 20 pitch.

For all dimensions send for Bulletin No. 111.



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promises ranging from 90 to 240 days.

Government purchasing officers buying direct for navy yards, arsenals and depots find it relatively easy to obtain revised higher ratings but private consumers, even those engaged on war production, experience much delay, due in part to confusion as to procedure.

Carbon bars for remelting, for a government shop, formerly bought direct on open bids, now are being allocated. Delivery of high-rated alloy bars is quoted into first quarter next year, although volume shipments of alternate alloy emergency bars can be made in August by some mills. Orders placed for some SAE grades are automatically being changed to NE specifications

High-speed tool steels are somewhat easier.

While demand for cold-finished is strong, notably in larger diameters for piercing, definite delivery promises are hampered by limited volume of hot bars for processing and cold-rolling capacity is not fully engaged. Much small-size volume for shot is being distributed by directives. Large rounds, four-inch and over, are heavily sold ahead and orders for hot material, taken originally at A-1-a, are around 10 weeks and becoming more extended.

Pipe

Pipe Prices, Page 117

Cast iron pipe buying is confined to government needs, utility and municipal buying being light, largely for repair and replacement. A New Jersey foundry has been loaded with more than 50,000 tons for war plants, deliveries on which extend into October.

Replacement of distributor stocks of steel pipe, especially lap-weld, is becoming tighter. Demand for butt-weld tapers, due to lack of private building. Distributors, faced with replacement difficulties, seek to confine sales to higher ratings which they can re-extend against new mill purchases.

Welded tubing is being more frequently substituted for seamless. Aircraft alloy grades are scarce and mills are heavily sold ahead. Shipyards are taking much steel pipe and several large contracts for alloy valves have been placed for the Navy.

It now appears that the mill price was shaded by a jobber on a 15,000-ton mill shipment of 8-inch and smaller steel pipe for delivery at a Navy supply depot.

Rails, Cars

Track Material Prices, Page 117

As a result of government restrictions on freight car building no domestic freight cars were awarded in June. Total bookings for first half, some of which are frozen and will not be built until the ban is removed, totaled 23,005 cars, compared with 94,765 in the corresponding period in 1941. Comparisons for four years follow:

	1942	1941	1940	1939
Jan.	4,253	15,169	360	3
Feb.	11,725	5,508	1,147	2,259
March	4,080	8,074	3,104	800
April	2,125	14,645	2,077	3,095
May	822	18,630	2,010	2,051
June	0	32,749	7,475	1,324
6 mos.	23,005	94,765	16,173	9,532
July	.....	6,459	5,846	110
Aug.	.....	2,668	7,525	2,814
Sept.	.....	4,470	9,735	23,000
Oct.	.....	2,499	12,195	19,634
Nov.	.....	2,222	8,234	2,650
Dec.	.....	8,406	7,181	35
Total	.....	121,499	66,889	57,775

Structural Shapes

Structural Shape Prices, Page 117

Review of projects suspended several weeks ago has restored some tonnage to backlogs, an instance being a powerhouse and other war construction which involved 6500 tons on books of a Pennsylvania fabricating shop. Most plain material deliveries this month are against directives, mainly to shipyards. The Maritime Commission's Liberty ship program will require about 1,500,000 tons of shapes and 6,500,000 tons of plates. Lighters being prefabricated by numerous structural shops will be assembled by a yard on the Atlantic coast.

Inquiry for engineering and construction needs has all but disappeared and fabricators seek any class of work on which their equipment can be engaged. Those with welding facilities have an advantage. A shop in the East is operating its welding equipment 24 hours a day and recalling field equipment for shop work.

WHEN LIGHT GLOWS IN THE DARKNESS.....

If you are concerned with bearings and bearing metals, but have never taken time to brush up on pertinent and intimate information regarding them, the entire subject may remain shrouded in darkness. A little light puts you on the right track, and helps your constructive thinking. The A. W. Cadman Manufacturing Co. turned the spotlight on the subject with two booklets, "Bearings and Bearing Metals," and "Cadman Metals." Printed for free distribution to all who are concerned with the subject of bearings and fine bearing metals, the booklets may be had for the asking. When do you want yours?

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CHICAGO: [illegible] PHILADELPHIA: [illegible] NEW YORK: [illegible]

Reinforcing Bars

Reinforcing Bar Prices, Page 117

Inquiry for concrete reinforcing bars has slackened materially but mills have heavy backlogs and requirements frequently require directives to obtain desired delivery. In spite of current shortage of semi-finished steel for this purpose several distributors, notably one with direct mill affiliations, have built up stocks for immediate delivery on contracts with high rating.

Reinforced underground fuel tanks in New England are replacing usual steel containers, the third group being placed recently, for which 5000 tons of bars have been divided between two distributors. About 150 tons of turnbuckles also will be required.

Wire

Wire Prices, Page 117

Wire finishing mills buying rods outside are confronted with curtailment in additional departments by limited supplies, an already tight situation in rods being aggravated by lend-lease allocations which are dislocating production schedules. Meanwhile specifications and orders for specialties are heavier and with some mills bookings exceed shipments. Producers in some cases are turning down inquiries for additional wire for rope mills. Demand for camouflage netting is brisk, makers of screen cloth benefiting. High carbon rounds and stock requiring heat treating predominate in bookings, flat wire lagging. Aircraft requirements, including alloys, are substantial, although the use of alloys is restricted where possible.

Pig Iron

Pig Iron Prices, Page 118

Pig iron allocations are largely stabilized, varying little from month to month except for changes resulting from new war contracts. Distribution is geared closely to inventory and higher priorities, the latter tending steadily to upper ratings. Minor changes in analysis are frequently accepted by melters to aid distribution.

Some manufacturers of civilian goods are being given iron in an effort to keep alive industries which are unable to convert to war production. How long this can be continued depends on demand for purely war production. In the face of diminishing scrap supply a greater proportion of pig iron may be diverted to steelmaking, cutting off supply to these melters.

One effect of conversion to war work is that some melters formerly using large tonnages of pig iron now are engaged on work requiring fewer castings and increased tonnage of rolled steel. This shift has released considerable pig iron for other consumers. Machine tool builders continue to use large tonnages of castings, for which sufficient iron is being provided.

A reconditioned blast furnace in eastern Pennsylvania has been relighted after long idleness and will provide additional supply for that area.

Large reserves in hands of consumers early in the year have been liquidated and the effort now is to keep inventory at about 45 days supply. Increases in monthly supply are confined mainly to upper ratings and in cases where there is unusual need for castings. Some cast iron pipe foundries are engaged on castings for war work, replacing their normal product.

Scrap

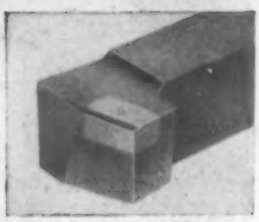
Scrap Prices, Page 120

Expectation of severe scrap shortage continues to grow and some observers even predict actual stringency will be felt by mills by the end of October, increasing from then on. Current receipts are barely sufficient for melters in some districts while in others steel production is maintained only by using stocks accumulated in recent months. In some districts open hearths are idle for lack of material.

Results of the nationwide drive are awaited with interest but general opinion is that they will be disappointing, as previous efforts have done much to bring out most of the dormant scrap. Automobile wrecking yards continue to contribute to the flow but are well depleted. Shortage of labor is caus-

Is KENNAMETAL* Economical?

LOOK AT THE RESULTS OF THIS TEST

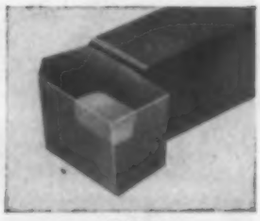


STYLE 21

OPERATION: ROUGH TURNING 155 MM. SHELL

TOOL	No. Shell per Regrind (Average)
KENNAMETAL (Grade KM)	130
KENNAMETAL (Grade KH)	127
KENNAMETAL (Grade K3H)	157
CARBIDE A	105
CARBIDE B	85
CARBIDE C	98
CARBIDE D	91

STYLE 11



STYLE 9

Because it removes more metal per regrind and more metal per tool life, KENNAMETAL is proving itself the most economical of all steel-cutting carbides, regardless of price.

In the shell machining test described, KENNAMETAL Grade KM turned more shells per tool than any other material tested, exceeding by more than 100% the number turned by some tools. One set of KENNAMETAL KM tools turned more than 3000 shells during the useful life of the tools.

KENNAMETAL machines steels of all hardnesses up to 550 Brinell at economical speeds and feeds, thus "hurrying up" production and reducing machining costs. Write for the facts about KENNAMETAL.

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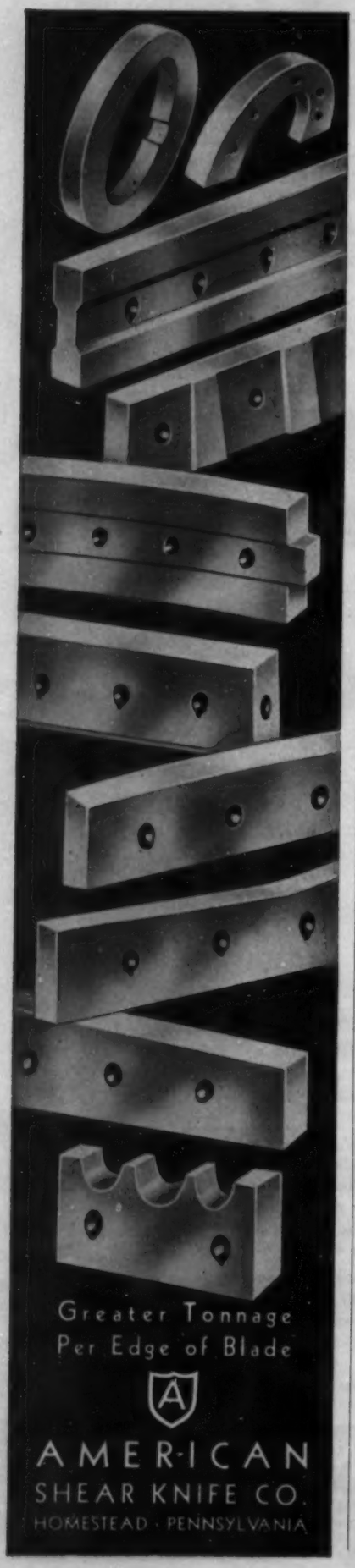


ing motor blocks to be sold without being cleaned.

Much industrial scrap now being produced is going direct to steel suppliers, bypassing dealers. Reclaimed rails usually are allocated and railroad scrap moves almost entirely by allocation. Railroad offerings are smaller than normal, carriers repairing such parts as can be reconditioned, as new parts are difficult to obtain.

Trend toward better supply of cast scrap grades continues, while steelmaking material is scarce. Rigid inspection is bringing about more careful grading and loading and rejections are fewer. Borings and turnings are in good volume but differentials do not appear broad enough to stimulate close segregation for strictly blast furnace and chemical use.

In New England revised freight rates result in moving scrap previously frozen in northern Maine but the total is not sufficient to increase supply materially. In that area heavy melting steel and low phos deliveries have slowed. Steelworks reserves are not down to the low point of last spring but efforts to build inventories have failed.

St. Louis mills continue steel production at a high rate, at the expense of reserves and no tonnage is being added to stock. Deliveries from the Southwest have declined and flood conditions continue to have some effect on collections.

In the Detroit district scrap receipts are slightly above consumption but not sufficient to permit building appreciable reserves. Yards are better stocked than a month ago, one cause being stricter observance of OPA regulations on quality, necessitating slower movement through yards.

Water receipts at Buffalo total about 125,000 tons since navigation opened, the larger part from upper lake ports, with some tonnage by barge from the East. In

Tool Steel Scrap

Cents per pound, to consumers f.o.b. shipping point

Tungsten Types

(For each 1% tungsten contained)

Solid scrap containing over 12%	1.80
Solid scrap containing 5 to 12%	1.60
Turnings, millings containing over 12%	1.60
Do., 5 to 12%	1.40
Turnings, millings, solids under 5%	1.25

Molybdenum Types

Solid scrap, not less than 7% molybdenum, 0.50 vanadium	12.50
Turnings, millings, same basis	10.50
Solid scrap, not less than 3% molybdenum, 4% tungsten, 1% vanadium	13.50
Turnings, millings, same basis	11.50

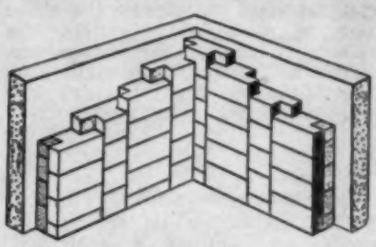
Mixed Scrap

(Molybdenum and Tungsten Types)

Solid scrap, each 1% contained tungsten	1.60
Solid scrap, each 1% molybdenum	.80
Millings, turnings, each 1% tungsten	1.40
Millings, turnings, each 1% molybdenum	.70

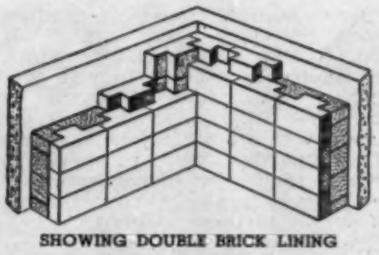
Keagler-Nukem

MONOLITHIC ACID PROOF CONSTRUCTION BRICK SHAPES



SHOWING SINGLE BRICK LINING
(PATENT APPLIED FOR)

Here is a new brick shape, manufactured of fire clay by the deairated method, and highly resistant to acid. It guarantees maximum strength of acid proof wall, and is particularly adapted for high temperature pickling tank construction. The bricks are so shaped that walls may be made 5" or 8" without using additional brick. The type shown above is especially adapted as a sheathing for steel rubber-lined tanks, concrete shell tanks, acid pits or wooden tanks. Samples and catalogs sent on request.



SHOWING DOUBLE BRICK LINING
(PATENT APPLIED FOR)

KEAGLER BRICK CO.

★

STEUBENVILLE, OHIO

pressure-proof!

CONSERVE machine efficiency! *Babbitt-tipped* Laminum shims, for pressure-lubricated systems, prevent oil and pressure losses. Body of shim retains all Laminum features of quick precision adjustment by *peeling* . . . in factory assembly or field service.

The .003 or .002 in. laminations are bonded into a solid unit . . . easy to peel.

Laminum shims are cut to your specifications. For repairs or maintenance, get stock shim materials from mill supply dealers. (Write us for illustrated shim application file-folder and Laminum sample.)

Laminated Shim Company
Incorporated
87 Union Street Glenbrook, Conn.

it's LAMINUM
THE SOLID SHIM THAT peels FOR ADJUSTMENT

spite of this addition to local collections mills have not been able to accumulate reserve stocks for winter.

Conditions have improved sufficiently in the Chicago area to allow two idle open hearths to be relighted after three weeks lost time. About 500 state-owned trucks and a large crew of WPA labor will canvass the rural regions of Illinois.

Michigan automobile wrecking yards in June moved 19,865 tons of scrap, it is officially announced, about 600 yards contributing. This represented 30,000 old cars. In addition to metal scrap 1206 tons of rubber was reclaimed.

Warehouse

Warehouse Prices, Page 119

As steel warehousemen hope for aid in obtaining more steel to serve customers engaged in war production a mixed situation prevails as to current replacements and quotas on most products. In some cases distributors were forced to ask mills to stop shipments on some items late in June, quotas for that month being filled. Others received and now are getting only a fraction of the tonnage due them. In general, all are short of galvanized sheets and large bar rounds.

A large eastern distributor normally carrying balanced inventory on standard products for five to six months now has less than two months supply, badly depleted as to sizes. In one instance a warehouse was able to fill only two items of 80 in a recent inquiry.

In New England normally 20 to 25 per cent of steel consumption moves through warehouses and this situation probably has worked out to the benefit of distributors there by affording a wide base for figuring quotas. Most steel bought by machine tool builders and hundreds of small consumers in that area is purchased from warehouse. Not until the present pinch have some ever bought steel from mills.

Pacific Coast

Seattle—The inland route for the proposed highway to Alaska is criticised by Pacific Coast interests who are advocating a railroad west of the Rockies. In this connection the Pacific Great Eastern railway, an uncompleted project in British Columbia, owned by that province, is the center of interest. This line could be extended to connect Prince George, B. C., and Vancouver, B. C., making the line accessible to Pacific Coast railroads. United States capitalists have made an offer for the road but it has been rejected.

Foundations are being placed for the aluminum rolling mill near Spokane, Wash., and steel and machinery are arriving. Bonneville Power Administration fails to confirm reports that it is building two additional 230-kv steel power transmission lines to serve Spokane war industries but Administrator Paul J. Raver announces his agency is prepared to care for needs of the Spokane area.

The policy of army and navy to

THIS is a corner of the completely equipped chemical and physical Laboratory at our Peerless Plant with X-ray room in background at right. Here the most modern testing equipment enables us to check constantly the quality of castings and maintain the high Wellman standards under today's urgent production schedule.

Castings in brass, bronze, aluminum and magnesium (Dowmetal).

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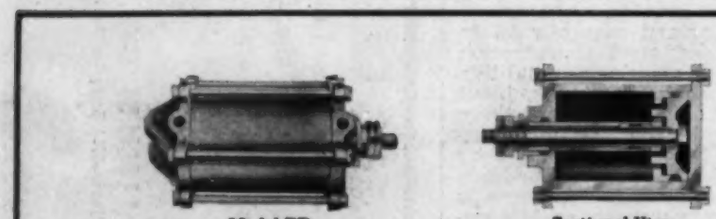
CLEVELAND, OHIO

A coil may develop a spring in a reptile, but in metal it takes coils of SCIENTECH *design to make a spring a hit.*

LEE SPRING COMPANY, INC.
30 MAIN STREET — BROOKLYN, N. Y.



Model BR — Sectional View

Precision Cylinder Construction Means Better Use of Air Power

Hannifin pneumatic cylinders have the features that mean greatest useful work from air power—without leakage, with minimum friction loss, and simplest maintenance. Hannifin cylinders, in all sizes, are bored and then honed, producing a cylinder bore that is straight, round, perfectly smooth. The soft, graphite-treated piston packing is easily adjusted from outside the cylinder, for easy maintenance of efficient piston seal throughout the entire life of the packing. The piston can be repacked if necessary with standard graphited packing, always available.

HANNIFIN MANUFACTURING COMPANY
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Engineers • Designers • Manufacturers • Double-acting Pneumatic and Hydraulic Cylinders • All Sizes

Get This New Bulletin: Complete specifications of Hannifin Pneumatic Cylinders and Air Control Valves are given in Bulletin 57-B, copies of which will be sent on request.

HANNIFIN PNEUMATIC CYLINDERS

use wood in place of steel, where possible, it relieving pressure on Coast rolling mills, which are now making inroads on an enormous backlog. Additional contracts for high priorities are being taken for large contractors who have defense projects in hand.

The Ross dam extension, a unit or Seattle's Skagit power project, has been granted priority for 550 tons of reinforcing steel required but the job is delayed, awaiting release of contractors' equipment. Scarcity of steel has halted the Spokane street viaduct, Seattle, revised plans being to complete one-third of the project, until required materials are available. The viaduct involves a total of 1500 tons of reinforcing placed with Bethlehem Steel Co., Seattle, early in the year.

The steel salvage scrap campaign continues to bring satisfactory receipts from the interior but consumers are buying direct in most cases as dealers are working under a handicap, being restricted to 30 and 60-day inventories. Mills are well supplied and are increasing stocks. Foundries also have ample cast scrap on hand. The trade is anxious about the near future when the country will have been swept clean and unfavorable weather impedes the flow of materials, especially in view of reduced inventories in dealers' yards.

Cities find it difficult to obtain suitable priorities for cast iron pipe and many improvements are being postponed. Several housing projects involve sizable tonnages which will be awarded soon. King County district No. 62 has received bids for 250 tons, alternate for transite, figures being $31,046 and $30,163, respectively, Michelotti & Co., Seattle, low. A private building project in Seattle involves two miles of water pipe, tonnage unstated, bids soon.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 117

Bolt and nut manufacturers are booked three months and beyond on highly rated tonnage, wooden barges, construction and miscellaneous requirements accounting for large tonnages. Shops producing both large and small sizes are operating at capacity, demand still maintaining backlogs. Some producers are seriously handicapped by limited supplies of carbon steel bars and are threatened with curtailment on some sizes unless replacements are obtained and appeals in some cases have been made to WPB for remedy.

Canada

Toronto, Ont. — Shortage of finished and semifinished steel for Canada's war industry is becoming more acute despite almost total suspension of supply to civilian and non-essential consumers. Canada's industry for production of war supplies has advanced much more extensively than capacity for producing raw materials and while provision with regard to the latter was late in getting started plans are underway for further large expansion in primary steel output. In

this connection the Steel Co. of Canada Ltd., Hamilton, this week announced plans for installation of bessemer and electric furnaces to cost about $2,775,000, while enlargements also are to be proceeded with immediately at other Canadian steel mills. To obtain urgently needed labor it is reported that many civilian plants may have to close down to release employes for war work.

Canada has about reached the top of her stride in shipbuilding and the only handicap to enlargement is supply of steel. Plate and sheet production is being maintained at maximum capacity and the government is directing all output into war industry, chiefly shipbuilding, tank and military vehicle production.

Inquiries for merchant bars are heavy and while mills are accepting orders delivery is uncertain. Demand is specially heavy for alloy and carbon bars and supplies are not sufficient for actual war requirements. Some consumers have been fairly successful in keeping plants supplied but others have been forced to curtail operations.

Pig iron sales are steady with all shipments under direct supervision of the steel controller. There has been some switching of orders from one producer to another and it is reported that a larger quota of the merchant demand has been swung over to the Canadian Furnace Co., which operates the only direct merchant furnaces in Canada. Other blast furnace operators require their pig iron for their own steelmaking activities.

Further slowing in scrap offerings from the rural districts has appeared. Offerings from automobile wreckers has dropped to a mere trickle, but larger tonnages are appearing from industrial plants. Remote sections are starting to pour in scrap with the result that supplies are keeping abreast of actual consumption. Consumers are tapping every available source and are chiefly concerned with building stock piles against scarcity later in the year.

Iron Ore

Iron Ore Prices, Page 119

Every ore carrier in the fleet of Inland Steel Co. has broken its best prior cargo-carrying record since the present season opened. L. E. Block, flagship of the fleet, a consistent maker of new records, docked July 8 with its largest cargo, 16,252 gross tons of iron ore, from Superior, Wis. Its largest cargo in 1941 was 15,834 tons. This was its fifteenth arrival at Indiana Harbor this season. The latest high mark by this ship compares favorably with the Great Lakes record for ships of all capacities.

Iron ore fleet of the Pittsburgh Steamship Co., largest on the Great Lakes, has transported 500,000 gross tons more ore to July 1 this year than in the comparable period in 1941, during which season more ore was carried than in any previous year. Increased movement was due to the earlier opening of navigation, deeper draft allowed and increased dock efficiency. The Pittsburgh fleet consists of 68 steamers and two barges, with a single-trip capacity of 770,000 tons.

First of the company's five new ships, LEon FRAser, launched last spring, set a new high for a single cargo, with 16,863 tons. Four sister ships are expected to be in service during the present season. The five new vessels will have a season capacity of 2,500,000 tons at present water levels.

Canadian ships in the ore trade, carrying ore to United States ports had carried 1,198,500 gross tons of ore to July 12. A total of 29 Canadian ships were involved in this movement. In 1941 season 21 ships were used and total ore for the season aggregated 705,572 tons. In 1941 Canada's participation did not start until July 15.

Steel in Europe

Foreign Steel Prices, Page 119

London—(*By Cable*)—Steel producers in Great Britain expect a rise in prices, due to an increase on price of coal. Order books of steel works are well filled and allocations are generous. Imports of iron ore for third quarter are severely restricted. Demand for heavy structurals is quiet but demand is increasing for ship and tank plates.

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Speed your production and improve your quality by using Ohio Knives. Special steels and years of research and experience assure you of the best knife when you buy Ohio. For smoother cutting and longer runs specify Ohio Knives now.

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ALL TYPES AND SIZES

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Patent Percussion Power Presses

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Nonferrous Metal Prices

July	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
1-16	12.00	12.12½	11.75	52.00	52.00	6.50	6.35	8.25	15.00	14.50	35.00

F.o.b. mill base, cents per lb. except as specified. Copper and brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.75
Zinc, l.c.l.	13.15

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices
(In cents per pound, carlots)

Copper

No. 1 heavy	9.25-10.00
Light	7.25- 8.00

Brass

No. 1 composition	8.75- 9.50
Yellow brass castings	5.50- 6.25
Auto radiators	6.50- 7.25
Red Brass, borings & turnings	8.50- 9.25

Zinc

Old	5.00- 5.75
New clippings	6.50- 7.25

Aluminum

Clippings	10.00-10.75
Cast	8.75- 9.50
Pistons	8.75- 9.50
Sheet	9.00- 9.75

Lead

Heavy	5.00- 5.50
Mixed babbitt	4.50- 5.25
Electrotype shells	5.00- 5.75
Stereotype, Linotype	6.25- 7.00

Tin and Alloys

Block tin pipe	44.00-46.00
No. 1 pewter	32.00-38.00
Solder joints	7.75-10.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l.	13.25
Standard No. 12 aluminum	14.50

MAGNESIUM

(12 pound rod, 4 in. diam.)

99.8% ingot, carlots	22.50
100 lb. to carlots	24.50
Extruded sticks, ¼ to 2 lb.	
Carlots	32.00
100 lb. to carlots	34.00

A carburizer to be versatilely efficient must possess properties other than its performance with molten steel. No. 348 Mexican Graphite is especially sized and processed and conveniently packaged to conserve a minimum of space in the furnace and on the floor. The densest, most soluble carbon obtainable for use in acid open hearth charges . . . free of sulphur and harmful impurities . . . provides over 70% carbon recovery with consistent, dependable results. Quiet action with 100% scrap charges. We invite correspondence regarding your problems.

THE UNITED STATES GRAPHITE CO.
SAGINAW MICH.

NO. 348 MEXICAN GRAPHITE

Nonferrous Metals

New York—A shortage of labor in mines, caused chiefly by the movement of workers to the aircraft and shipbuilding industries which are paying increasingly higher wages, is checking the uptrend in output of copper, lead and zinc. Donald Nelson, chairman of WPB, is quoted as saying: "We are not getting the expanded output of copper that we expected for this year." The planned copper requirements are not being met.

Officials of WPB, Army, Navy and Manpower Commission have been meeting with representatives of the mining industry on the production problem. Officials indicate that with supply running behind requirements there may be serious trouble in key war production industries later in the year. Officials estimate there is an actual shortage of from 4000 to 5000 mine workers now and that 2000 to 3000 more will be needed this fall.

Smelters and refiners of 13 nonferrous metals, including copper, lead and zinc, operating under Order P-73 need not file PRP applications for the third quarter and will continue to operate under P-73 for that period. All serially numbered copies of P-73 have been extended to Oct. 1, 1942.

After July 31 copper and brass foundries must report all deliveries to customers during the previous month on Forms PD-123A and PD-123B, showing by the use of a simple set of symbols the final end-use of products in each shipment.

Basic lead sulphate white and blue prices declined ¼-cent, effective as of May 11, 1942. Sellers of lead scrap materials have been granted permission in Amendment No. 3 to Revised Price Schedule No. 70 to charge buyers for the copper contained in terminals of submarine batteries.

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES . . .

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Minneapolis office, Contract Distribution Branch of WPB, 326 Midland Bank building, is seeking contractors for the following:

S.O. No. 224: Miscellaneous gas engine parts, from small, simple valve pins to shafts, gears, liners and flywheels, in quantities from 200 to 24,000. A variety of pieces and machine requirements to choose from. Prints available for inspection at Minneapolis office.

S.O. No. 228: Subcontractor required for 22 sizes condenser shafts, 250 to 1000 of each. Condenser cup bearing, 250 to 500. Condenser guide bearing 250 to 500. A-1-a priority. Material furnished. Work to be done on screw machines, beginning August 1. Blueprints at Minneapolis office.

S.O. No. 229: Electric connector socket housing, 1000 per week. Socket pin, 20,000 per day. Socket, 30,000 per day. LC 70 clamp ring, 50,000 at 1200 per day. LC 71 clamp ring, 50,000, 1000 per day Material furnished, priority A-1-a. Screw machine operations, operation layouts. Cam and timing specifications available. Blueprints and sample at Minneapolis office.

S.O. No. 225: Machining of armature shafts, five different sizes, quantities 2500 to 25,000, 125 to 400 daily. Shafts vary in length from 7 to 12 inches with largest diameter about 11/16-inch. External grinding required on certain diameters. Some shafts require knurling and threading. Prints at Minneapolis office.

New Orleans, La., office, naval and marine section, 441 Canal building, is seeking contractors for the following:

Subcontractors desired for manufacture of masts and booms. Main mast 62 feet 3 inches long, consisting of three swaged pieces, 21 feet nine inches x 27 inches O.D. ⅛-inch thick; 14 feet x 25 inches O.D. ⅛-inch thick; 13 feet x 23 inches O.D., .32-inch thick and welded on pipe 15 feet 9 inches O.D. x .25-inch thick. Foremast 54 feet long, three swaged pieces 18 feet x 12¾ inches O.D., .375-inch thick; 19 feet 6 inches x 10¾ inches O.D., .365-inch thick, and 19 feet 6 inches x 9 inches O.D., .25-inch thick. Ten-ton boom 45 feet long consists of three swaged pieces 13 feet 6 inches long x 10¾ inches O.D., .365-inch thick; 21 feet x 12¾ inches O.D., .375-inch thick and 13 feet 6 inches x 10¾ inches O.D. .365-inch thick. Prints at this office.

Subcontractor desired for manufacture of doors, hatch and manhole covers. To be made of dished plate or mild steel stiffened flat plate. Quantity, 87 units, in sets of six. Designs for these watertight and weathertight doors are similar to those manufactured by Edward G. Budd Mfg. Co. Any doors similar to these will be acceptable. A-1-a priority.

Milwaukee office, Contract Distribution Branch of WPB, 161 West Wisconsin avenue, Milwaukee, Wis., is seeking contractors for the following:

WP316X: Subcontractor sought to machine steel locking ring, external diameter 2⅝-inch, broached internally of an irregular form, radius of which is .937-inch, width .385-inch and piece is medium knurled on exterior surface. Prime states it is possible to make piece economically on turret lathe with proper feed by machine normally using 2⅞-inch capacity four or six spindle automatic. Prime will supply material, which may be solid bar stock, due to uncertainty of availability of tubing.

WP320X: Boring mill facilities wanted by prime on mills having capacity range from 36 to 55 inches. Deliveries will be required one month or earlier after sub receives castings. Also require 40 hours per week for three or four months on 60 or 72-inch boring mill. Tolerances range from .001 to .005. Drawings at Milwaukee office.

WP325: Subcontractors needed to make contour dies for 30 and 50 caliber shells. Must have internal grinding equipment to do this work. Prime will furnish material.

New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:

S-154: New Jersey manufacturer is seeking a subcontractor for production of steel spools cadmium or zinc plated to withstand 24-hour salt spray test. Materials, 1⅝-inch cold-drawn steel bar, to be furnished by subcontractor. Tolerance, commercial. Machines required, automatic screw machine and drill press. Quantities, 100,000 to 500,000. Blueprints and samples at Newark, N. J., office, 20 Washington place.

D-32: Long Island City manufacturer is seeking automatic screw machine facilities, 1⅜-inch swing, for production of steel spring slip bolts and nuts, and brass studs. Quantity, spring clip bolts and nuts 6400 each; studs, 1600.

S-155: Ohio manufacturer is seeking subcontractor who can produce ring locks for gun trunnions. Material, steel. Air Corps specification WAS57-107-12, diameter 2 7/16-inch by .385-inch wide. Tolerances close. Quantity, 36,000, —500 daily. Machines needed, automatic screw machines, capacity 2⅞-inch, or turret lathes, broaching equipment. Blue prints at this office, 122 East Forty-second street.

S-156: Ohio manufacturer seeks subcontractors with turret lathe and screw machine facilities for production of steel precision parts. One is 1⅝-inch diameter by 2½ inches long, the other 2 inches diameter and ⅝-inch long. Material cold-drawn steel. Tolerance, .005. Quantity, 125,000 of each. Machines needed, 2—2¼-inch turret lathes and 2—2¼-inch four-spindle automatic screw machines. Materials furnished by prime contractor. Blueprints available at New York office.

D-33: Brooklyn manufacturer of ordnance items is seeking 4 or 6-spindle Gridley turret lathe facilities for machining of a large quantity of bomb tail fuze parts. Total of 50,000 of each of these parts is wanted in quantities of 15,000 to 20,000 per month. Parts consist of tube, carrier movable gear, body, cup bearing, cup body.

D-34: A Bridgeport, Conn., ordnance manufacturer is seeking single-spindle automatic screw machine facilities for rough machining of unlimited quantities of .30 caliber steel bullet cores. Prime contractor will furnish tools and material at cost. Material, manganese-molybdenum cold-drawn steel, FXS-318. Subcontractors with minimum of five single-spindle automatic screw machines available are particularly desired.

S-157: Detroit manufacturer seeks subcontractors who can produce end connectors for tanks, rough or machined complete. Made of cast steel, 6⅛ x 5⅛ x 3 inches. Tolerances, .005, large quantity. Machines needed, casting facilities and, if possible, drilling machines. Blueprints at New York office.

S-158: Pennsylvania electrical firm seeks subcontractors having automatic screw machines for production of parts of WD 1015 steel. Parts are 2.299-inch diameter by 1.369-inch long and 2.479-inch diameter and 3.299-inch long. Commercial tolerances. Quantity 250,000. Machines needed, 3 or 3¼-inch automatic screw machines. Blueprints at New York office.

D-35: New York City radio manufacturer is seeking automatic screw machine facilities for manufacture of radio parts. Materials and tools must be furnished by subcontractor. Three rotor sleeves are required. Material, H.H. brass tubing. Dimensions, ⅜ x 3⅝ and ⅛ x 2½-inch. Quantity, 5000 each of two larger sizes and 10,000 of the smaller. Also required, stator support, H.H. brass rod, ¼ x 2¼-inch. Quantity 20,000.

S-159: New Jersey manufacturer is seeking subcontractors having planer millers for machining of parts. Must take work over 30 inches and must be equipped with vertical and two side heads. Continuous work available. Blueprints available at Newark dis-

trict office, 20 Washington place, Newark, N. J.

S-160: Ohio manufacturer seeks subcontractors who can produce heavy forged propeller blades. Material, steel, X4340. Weight of metal required, 86 pounds; weight of finished forging 68 pounds; Length of forgings, 54 inches; width, 7¾ inches; size of bar used, 3⅛-inch; length of bar used, 40 inches. Equipment required, 12,000-pound hammer, heat treating facilities to attain hardness of 286 to 321 Brinell.

S-162: New York manufacturer seeks subcontractors with facilities to produce small steel parts, of WDX 1314 steel, 1.57 x 1.375-inch diameter. Tolerances, .003. Quantity, 1,000,000. Machines needed, automatic screw machines, capacity, 1⅛-inch. Blueprints at New York office.

STRUCTURAL SHAPES .

SHAPE CONTRACTS PLACED

10,000 tons, aluminum plant, New Jersey, to Bethlehem Steel Co., Bethlehem, Pa.

2400 tons building, Haskelite Mfg. Corp., Grand Rapids, Mich., to Whitehead & Kales.

1250 tons, forge shop, Taylor Forge & Pipe Works, Chicago, to Joseph T. Ryerson & Son Inc., Chicago.

750 tons Ohio Steel Foundry Co., Lima, O., to Indiana Bridge Co., Muncie, Ind.

200 tons, two beam bridges, Winnebago county, Illinois, to Rock Island Bridge & Iron Works, Rock Island, Ill.; Olson Construction Co., Waterloo, Iowa, contractor; bids June 12.

100 tons, piling, intake, octane plant, Standard Oil Co., Whiting, Ind., to Bethlehem Steel Co., Bethlehem, Pa.; Wenzel & Henock, Milwaukee, contractor.

SHAPE AWARDS COMPARED

	Tons
Week ended July 17	14,700
Week ended July 11	7,332
Week ended July 4	12,700
This week, 1941	35,030
Weekly average, 1942	25,260
Weekly average, 1941	27,284
Weekly average, June, 1942	15,474
Total to date, 1941	864,040
Total to date, 1942	707,280

Includes awards of 100 tons or more.

Superior
steel corporation
HOT & COLD ROLLED STRIP STEEL
AND SUPERIOR STAINLESS STEELS
IN ALL GRADES AND ANALYSES
Successfully Serving Steel Consumers for Half a Century
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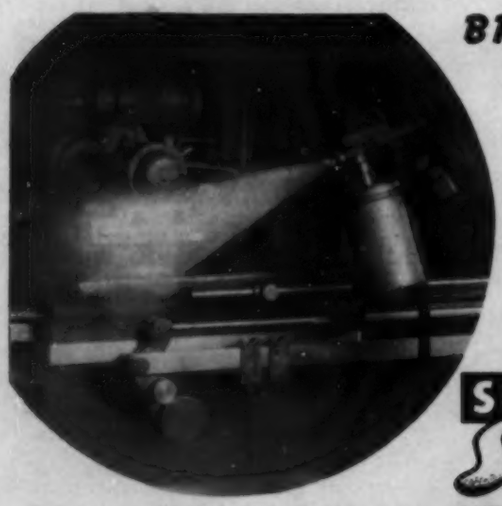
GENERAL OFFICES AND WORKS: CARNEGIE, PA.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SPRAY IT!
OR DIP IT!
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REINFORCING BARS . .

REINFORCING STEEL AWARDS

5000 tons, reinforced concrete underground fuel oil tanks, naval depot, divided, Truscon Steel Co., South Boston, Mass. and Joseph T. Ryerson & Son, Inc., Cambridge, Mass.; Leonard Construction Co., New York, and James Monroe & Sons Co., Attleboro, Mass., joint contractors.

3000 tons, synthetic rubber plant, for Synthetic Rubber Inc., to Carnegie-Illinois Steel Corp., Chicago; Lummus Co., New York, contractor.

800 tons, locks, Sault Ste. Marie, Mich., for government, to Ceco Steel Products Corp., Chicago; Great Lakes Dredge & Dock Co., Chicago, contractor; bids June 15.

337 tons, Chain Belt Co., Milwaukee, to Worden-Allen Co., Milwaukee.

125 tons, Nash Kelvinator Corp., Kenosha, Wis., to Worden-Allen Co., Milwaukee; Huntzinger Construction Co., contractor.

REINFORCING STEEL PENDING

Unstated, material for Anderson Ranch power house, Idaho; bids in to Reclamation Bureau, Denver, July 10.

PIPE . . .

CAST PIPE PENDING

250 tons, King County, Washington, water district No. 62; Michelotti & Co., Seattle, low, $31,046 for cast iron; $30,162 for transite; Gardner, Gardner & Hitchings, Seattle, engineers.

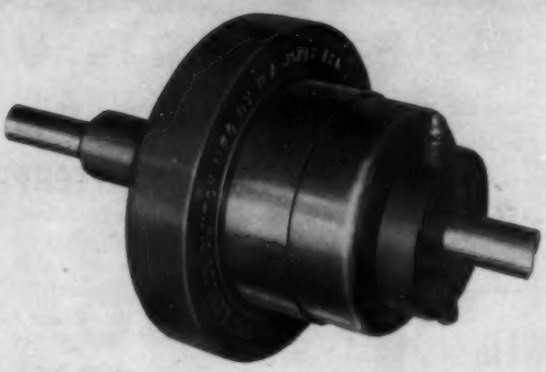
Unstated, private housing project, Seat-

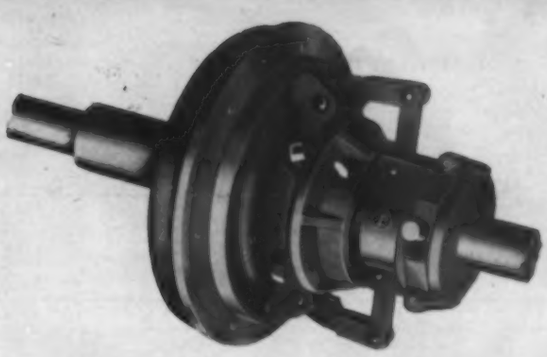
CONCRETE BARS COMPARED

	Tons
Week ended July 17	9,362
Week ended July 11	4,955
Week ended July 4	38,285
This week, 1941	14,972
Weekly average, 1942	10,085
Weekly average, 1941	13,609
Weekly average, June, 1942	5,460
Total to date, 1941	334,143
Total to date, 1942	282,374

Includes awards of 100 tons or more.

JONES-LEMLEY FRICTION CLUTCHES





JONES-LEMLEY friction clutches are built for a broad range of shaft sizes and ratings in both enclosed and open types for sleeve and coupling work. In addition they are available in a line of Jones-Lemley friction clutch pulleys. This clutch modification is also used for gears, V-belt sheaves, sprocket wheels, etc. Sizes, ratings, dimensions, prices and other data are contained in Bulletin No. 60. Your request will bring a copy.

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2. and 3. Same type, after only 3 months of service. Worn beyond efficient operation, with loss of over half of blade material.
4. and 5. Same type. Each blade coated with 1½ lbs. of COLMONOY No. 6. In constant use for over a year, and still operating efficiently.

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tie, involving two miles of pipe; bids soon; Ed. F. Hughes, Seattle, engineer.

RAILS, CARS . . .

LOCOMOTIVES PENDING

Seaboard Air Line, six 5400-horsepower diesel freight engines and two 1000-horsepower diesel switchers; application filed for proposed financing.

CAR ORDERS PLACED

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Lehigh Valley, released by WPB, transportation equipment branch, 1000 hopper cars, 440 of steel construction, and 560, wood and steel, to Bethlehem Steel Co., Bethlehem, Pa.

BUSES BOOKED

A.c.f. Motors Co., New York: Twelve 31-passenger for Capital Transportation Co., Pine Bluff, Ark.; twelve 37-passenger for Union Bus Co., Jacksonville, Fla.; ten 37-passenger for Southeastern Greyhound Lines, Lexington, Ky.; ten 31-passenger for Middlesex & Boston Street Railway Co., Newtonville, Mass.; ten 33-passenger for Conestoga Transportation Co., Lancaster, Pa.; eight 33-passenger for Valley Transportation Co., Lemoyne, Pa.; seven 39-passenger for Harrisburg Railways Co., Harrisburg, Pa.; seven 37-passenger for Florida Motor Lines Corp., Jacksonville, Fla.; four 45-passenger for Eastern Massachusetts Street Railway Co., Boston; four 43-passenger for Peoples Transit Co., Dayton, O.

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CONSTRUCTION and ENTERPRISE

Michigan

DETROIT—Arrowsmith Tool & Die Inc. has been incorporated with $20,000 capital to engage in tool and die making, by William Arrowsmith, 9272 Quincy street.

DETROIT—Duplicate Machine Corp. has been organized with $50,000 capital to deal in metals; Samuel W. Leib, 2057 Union Guardian building, is correspondent.

DETROIT—Grinding Inc. has been formed to do precision grinding; Robert E. Davis, 2914 Pingree street, is correspondent.

DETROIT—Grand Steel & Mfg. Co. has been organized to do manufacturing; Sonia Mellon, 2705 Calvert avenue, is correspondent.

DETROIT—Austin Co., Detroit, has been awarded contract for addition to factory at 11111 French road for Clayton & Lambert to cost $70,000.

DETROIT—Sal-Way Steel Treating Co. has given contract to Campbell Construction Co. for addition to factory at 14034 Woodrow Wilson.

DETROIT — Barton-Malow Co. has let sub-trades for factory at 1234 Mt. Elliott for McReynolds Die & Tool Co.

DETROIT—Ring Screw Works has given contract to William C. Peters, Detroit, for addition to factory at 1340 East Milwaukee.

DETROIT—Bennage & McKinstrie Co. has contract for addition to factory at 20201 Hoover for Deluxe Die Works.

DETROIT—William C. Peters has awarded sub-trades for addition to plant of Michigan Stove Co. at 6450 East McNichols. Estimated cost $72,000.

DETROIT—George W. Auch Co. has contract for factory at 17272 Mt. Elliott for Enterprise Tool & Gear Corp.

DETROIT—V. L. Graf Co., 9556 Grinnel, has awarded sub-trades for factory and office building to cost $52,000.

DETROIT — Haberkorn-Barry Co. has been given contract for factory at 17271 Mt. Elliott for Schwartz Boring Co.

DETROIT—Embassy Industrial Engineering Co., 4465 Woodward avenue, has been organized to deal in metals, ores and minerals.

GARDEN CITY, MICH.—City plans waterworks extension costing $50,000. G. Jerome & Co., 1850 National Bank building, Detroit, engineer.

GROSSE POINTE, MICH. — Martin A. Preston Inc., Grosse Pointe Farms, was awarded contract for factory at McDougall and Franklin streets for Ulta-Lap Machine Co.

GROSSE POINTE, MICH.—Lucien Boutelgier, Grosse Pointe, has been awarded contract for factory on Iowa avenue for Sterling Gauge Co.

HIGHLAND PARK, MICH.—Clausen Co., Detroit, has been awarded contract

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Copper—sheet, tubing
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SPEED-UP FOR WAR PRODUCTION

for factory at 369 Midland street here for Meade Screw Co., to cost $50,000.

JACKSON, MICH. — Camshaft Machine Co,. 719 Woodworth road, has been incorporated with $50,000 capital to deal in mechanical appliances. Harold Andrews, 765 Beverly Park, Jackson, is correspondent.

Connecticut

STAMFORD, CONN. — Northam Warren Corp. plans factory addition costing approximately $40,000.

New York

BUFFALO—McCauley Metal Products Inc., 660 Grant street, plans one-story plant addition to cost over $40,000.

LONG ISLAND CITY, N. Y.—General Bronze Corp., 34-19 Tenth street, will build one and two-story 100 x 348-foot factory and office, costing $75,000. S. Strauss, care of owner, architect.

NEW YORK—Hydrawmatic Machine Co., 408 Concord avenue, has plans by Moore and Landsiedel, 509 Welles avenue, for two-story 72 x 126-foot factory and office building. Estimated cost $75,000.

WELLSVILLE, N. Y.—Moore Steam Turbine Co. will spend approximately $40,000 for plant addition.

New Jersey

CAMDEN, N. J.—Flexitallic Gasket Co. has plans by G. M. Ewing, Architects building, Philadelphia, for manufacturing plant addition.

TRENTON, N. J.—Ajax Electrothermic Corp. has let contract for addition, 97 x 162 feet to cost $12,000.

TRENTON, N. J.—Baldwin-Hill Co. will erect one-story addition to plant to cost $20,000.

Ohio

CLEVELAND—Benco Mfg. Co., W. T. Jack, president, 10618 Cedar avenue, may purchase former dance hall and roller rink at 10626 Cedar avenue for light manufacturing purposes if board of zoning appeals will approve.

CLEVELAND—Hill Acme Co., A. C. McDaniel, president, is erecting 10,000 square foot addition to warehouse at 6400 Breakwater avenue.

CLEVELAND — Cleveland Wire Spring Co., 1281 East Thirty-eighth street, will start work on addition and alteration program.

CLEVELAND — George Adler Foundry, 1510 University road, is preparing to enlarge foundry by 2500 square feet.

CLEVELAND—Park Drop Forge Co., Fred L. Ball, secretary-treasurer, 730 East Seventy-ninth street, plans to erect shop building to house heat treating equipment and possibly some new drop hammers.

CLEVELAND—Midwest Forge Co., 17301 St. Clair avenue, recently sustained damages to its buildings and equipment by fire. Guy W. Waters is vice president, and Harry E. Boden, secretary.

CUYAHOGA FALLS, O.—Cuyahoga Machine & Welding Co., 1691 Water street, is expanding plant by over 500 square feet.

SHELBY, O.—Miller-Shelby Products Co. will add 31,380 square feet to factory here. Project has been started.

Pennsylvania

BRADFORD, PA. — Bovaird & Seyfang Co. is making alterations and constructing additions to its plant. Estimated cost $50,000.

ERIE, PA.—Erie Foundry Co., D. A. Currie, president and general manager, 1253 West Twelfth street, has asked bids for one-story 100 x 450-foot plant addition.

PHILADELPHIA—Kessler Chemical Co., Cottman street and State road, is considering erection of plant.

PHILADELPHIA—I.T.E. Circuit Breaker Co., Hamilton street, has let contract to Smith & Buzly, 2020 Chancler street, for altering and building an addition to its plant. (Noted July 6).

PHILADELPHIA — Fairmount Foundry, Third and Westmoreland streets, has let contract to Haverstick-Borthwick Co., 1814 Chestnut street, for foundry. E. Schoeppe, 1602 Spruce street, architect. (Noted July 6).

WILLIAMSPORT, PA. — Pennsylvania Power & Light Co. plans additional boiler unit costing about $40,000.

Illinois

ROCKFORD, ILL.—Sundstrand Machine Tool Co., 2431 Eleventh street, has let general contract for one-story building, 130 x 501 feet, to Holm-Page Co., 2117 Kishwaukee street. G. A. Johnson, Swedish-American Bank building, is architect.

Alabama

BIRMINGHAM—Southern Steel Works Co., 903 Third avenue West, is erecting plant on North Forty-first street, East Birmingham, consisting of assembly shop, main fabricating building, warehouse, machine shop and storage building.

Maryland

BALTIMORE—Bethlehem Steel Co. has taken bids for shop and power house building on Key highway here.

FAIRFIELD, MD.—Bethlehem Fairfield Shipyard Inc. has let contract to Cummins Construction Corp., 803 Cathedral street, Baltimore, for switchboard building and welding building.

Kentucky

LOUISVILLE, KY.—Struck Construction Co., Louisville, has been awarded general contract for manufacturing and assembly building here for Curtiss-Wright Corp.

North Carolina

MORGANTON, N. C.—National Carbon Co., 30 East Forty-second street, New York, will operate $6,000,000 plant here for manufacture of electrodes for metallurgical and chemical industries.

Missouri

LEBANON, MO.—City, W. E. Kerr, mayor, will take bids soon for waterworks improvements and distribution system, cost of which is estimated at $291,000. Russell & Axon Inc., 2903 Delmar boulevard, St. Louis, engineer.

SPRINGFIELD, MO.—Springfield Gas & Electric Co., E. S. Willever, acting manager, plans $228,000 power plant expansion.

Oklahoma

HENRYETTA, OKLA.—Eagle Picher Mining & Smelting Co., B. A. Troutman, superintendent, will build $600,000 addition.

Wisconsin

BERLIN, WIS.—W. K. Parsons Products Co. has awarded contract for one and two-story plant addition to George Seaman, Berlin. J. F. Dreger, 188 Waugoo street, Oshkosh, Wis., architect.

Texas

BANDERA, TEX.—Bandera Electric Co-operative has REA allotment of $385,000 for rural lines.

HONDO, TEX.—Medina Electric Co-operative has REA allotment of $509,000 for rural lines.

KARNES CITY, TEX.—Karnes Electric Co-operative has REA allotment of $417,000 for rural lines in Karnes county.

LONGVIEW, TEX.—War Emergency Pipe

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350-S

Line Co., W. Akton Jones, president, Longview, will establish six pumping stations in Arkansas in connection with $35,000,000 pipe line to be built from Longview to Illinois.

California

INGLEWOOD, CALIF.—Northrop Aircraft Co. will operate $5,000,000 bomber assembly plant to be built in Colorado.

LOS ANGELES—Pacific Coast Iron Corp. has been organized with $250,000 capital by Donald MacDonald, R. C. MacDonald and R. S. Hicks. Corporation is represented by E. H. Smith, 823 Title Guarantee building, Los Angeles.

SACRAMENTO, CALIF. — Sacramento Pipe Works is having plans prepared for fabricating shop to cost $12,000.

TORRANCE, CALIF.—Plans are being prepared for $15,000,000 butadiene plant here for Shell Chemical Co.

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Washington

ELLENSBURG, WASH.—City has leased a garage building to be used as a municipal machine shop.

RENTON, WASH. — Local housing authority will take bids for water supply system and sewage disposal plant. Lidral Construction Co. has contract to erect 1,500,000-gallon water storage tank and standpipe.

SEATTLE—Tennent Steel Casting Co., 3444 Thirteenth avenue Southwest, is increasing capacity and building a plant addition.

SEATTLE—Lake Union Drydock & Machine Works, 1515 Fairview avenue North, will build steelworking shop, 32 x 105 feet.

SEATTLE — Bethlehem Steel Co., 4001 Twenty-eighth avenue Southwest, is building an addition to its refractory plant.

SEATTLE—Washington Iron Works, 1500 Sixth avenue South, has let contract to Hainsworth Construction Co. for machine shop, 50 x 110 feet.

Canada

VANCOUVER, B. C.—Canada Chain & Forge Co. Ltd., Granville Island, is having plans prepared for plant addition to cost about $35,000 with equipment.

BATAWA, ONT.—Bata Shoe Co. of Canada Ltd., Frankford, Ont., plans to start work soon on plant addition to cost about $25,000, equipment extra.

BRANTFORD, ONT.—Massey-Harris Co. Ltd., Market and Greenwich streets, has given general contract to Cromar Construction Co. Ltd., 448 Colborne street, for further plant addition and installation of equipment to cost about $87,000.

GALT, ONT.—Dominion Wheel & Foundries Ltd., George street, is having plans prepared for plant addition to cost about $35,000, with equipment.

GUELPH, ONT.—Leland Electric, Canada Ltd., 50 Crimea street, has given general contract to M. Balconi & Son, 122 McDonnell street, for plant addition to cost $15,000, equipment extra. Mahoney & Austin, 79 Quebec street, architects.

HAMILTON, ONT.—Dominion Foundries & Steel Ltd., Depew street, is having plans prepared for addition to foundry to cost about $50,000 with equipment. C. D. Howe Co. Ltd., Pigott building, designing engineer.

KINGSTON, ONT.—Kingston Shipbuilding Co. Ltd., Ontario street, will start work soon on plant addition to cost about $20,000. Woodworking equipment will be installed.

KITCHENER, ONT. — Canadian Transformer Co., 215 King street West, will start work soon on plant addition to cost about $25,000, with equipment.

LEASIDE, ONT.—Canadian Aircraft Instruments & Accessories Ltd., Vanderhoof Drive, has given general contract to R. J. Hibbs Construction Co. Ltd., 15 Trent avenue, Toronto, for plant addition to cost $60,000 with equipment.

MERRITTON, ONT.—Hayes Steel Products Ltd. has begun work on forge shop, inspection shop and craneway to cost about $625,000 with equipment. Ontario Construction Co. Ltd., Box 36, St. Catharines, and Newman Bros. Ltd., 127 St. Paul street, St. Catharines, general contractors.

OTTAWA, ONT.—Ottawa Car & Aircraft Ltd., 301 Slater street, will proceed with plant addition to cost $16,000, equipment extra.

OWEN SOUND, ONT.—Russell Bros. Ltd., Third avenue East, will start work soon on plant addition and will purchase woodworking machinery, electric drills, motors, welding equipment, etc., to cost $23,000.

PETERBOROUGH, ONT.—Canadian General Electric Co. Ltd., 212 King street West, Toronto, has given general contract to A. W. Robertson Ltd., 57 Bloor street West, Toronto, for plant addition to cost $20,000.

THOROLD, ONT.—Ontario Paper Co. Ltd., Allanburg road, has plans and will let contracts soon for plant addition to cost about $385,000, with equipment.

TORONTO, ONT.—John T. Hepburn Ltd., 18 Van Horne street, will proceed with plant addition to cost about $20,000.

TORONTO, ONT.—DeHavilland Aircraft of Canada Ltd., Sheppard avenue, has extended contract to A. W. Robertson Ltd., 57 Bloor street West, for further plant addition to cost about $300,000 with equipment. David Shepherd, 57 Bloor street West, is consulting engineer. Harry H. Angus, 1221 Bay street, mechanical engineer.

TORONTO, ONT.—Peerless Engineering Ltd., 11 Charlotte street, has given general contract to J. Robert Page, 18 Toronto street, for plant building on Branton avenue to cost about $235,000 with equipment.

WINDSOR, ONT.—Colonial Tool Co. Ltd., 1857 Sandwich street East, in association with Department of Munitions and Supply, H. H. Turnbull, secretary, Ottawa, will take bids through J. P. Thompson, architect, 1191 Windemere road, for machine cutting tool plant to cost $135,000, in which machinery and equipment to cost $365,000 will be installed.

WINDSOR, ONT.—Ford Motor Co. of Canada Ltd., 2480 Sandwich street West, has let general contract to Hein Construction Co., 172 Aylmer avenue, for plant addition to cost $35,000.

WINDSOR, ONT.—Chrysler Corp. of Canada Ltd. will start work soon on erection of plant addition to cost $17,500, equipment extra.

LAUZON, QUE.—Davie Shipbuilding & Repairing Co. Ltd., in association with Department of Munitions and Supply, Ottawa, has given general contract to Foundation Co. of Canada Ltd., 1538 Sherbrooke street West, Montreal, for plate mill to cost $100,000.

MONTREAL, QUE. — Electric Tamper & Equipment Co. of Canada Ltd., 1440 St. Catharine street West, has let general contract to Walter G. Hunt Co. Ltd., 1405 Bishop street, for plant addition to cost $25,000.

MONTREAL, QUE.—Dominion Bridge Co. Ltd., First avenue, Lachine, Que., will enlarge its plant here to cost about $125,000, with equipment.

MONTREAL, QUE.—Canadian National Railways, Barton Wheelwright, chief engineer, Union Station, Toronto, Ont., is receiving bids for addition to plant to cost about $60,000.

MONTREAL, QUE. — Anglo-Canadian Wire Rope Co. Ltd., Fairview avenue, Rockfield, has plans for further plant addition to cost about $35,000.

QUEBEC, QUE. — City, Lucien Borne, mayor, Edouard Hamel, city engineer, in association with Department of Public Works, Ottawa, has given general contract to J. A. Auclair, Gifford, Que., for St. Charles river sewage system to cost $279,813.

ROCK ISLAND, QUE.—Union Twist Drill Co. Ltd. is taking bids through Lawson & Little, architects, 660 St. Catharine street West, Montreal, for addition to plant to cost about $300,000.

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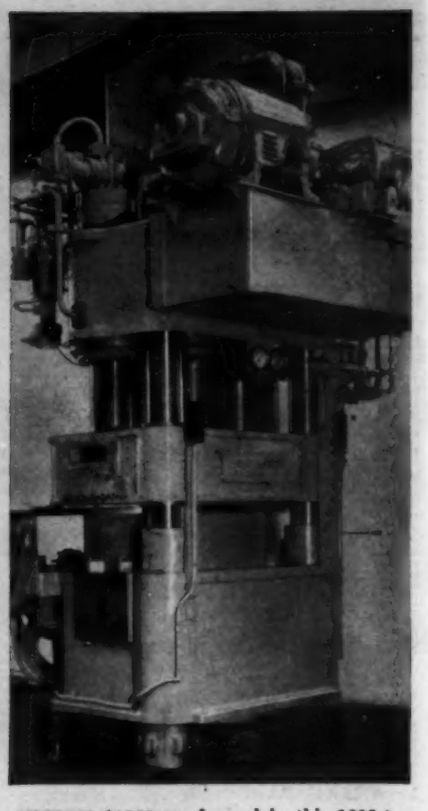
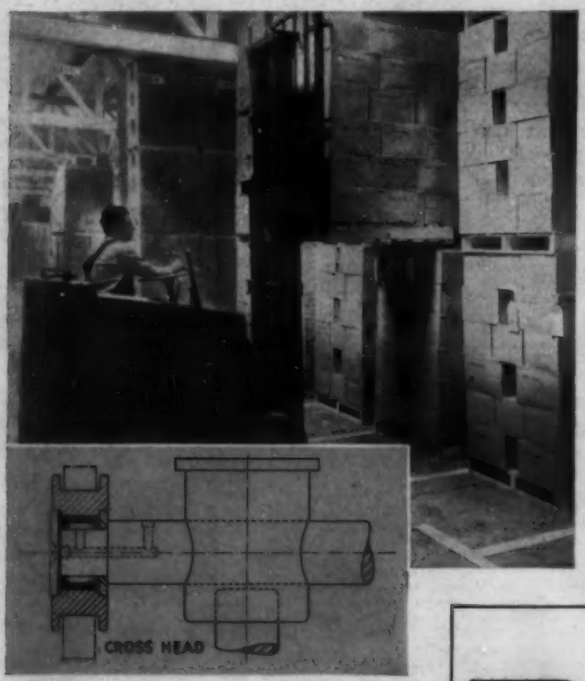
OIL IS AMMUNITION—and in the search for new sources of this essential war material modern drilling equipment is playing a vitally important role. Typical example of progressive design is this portable drilling unit built by Franks Manufacturing Corporation for quick location-to-location moves. Drawworks, pumps, auxiliary engines, and rotary drive equipment are mounted on a single truck—and derrick can be folded down by special patented screw mechanism. Main thrust bearing on swivel of this and similar Franks units is Bantam Flat Segmented Roller; main bearing and upper radial bearing in rotary table are Bantam Tapered Roller.



AIRCRAFT PARTS are formed in this 1200-ton three-column press made by Williams, White & Co. It is powered by an Oilgear Two Way Variable Displacement Pump equipped with two type ALI Bantam Radial Roller bearings on front and rear of rotor to insure efficient, dependable operation at all times.



MAN-HOURS SAVED in handling materials help keep production at peak levels. Lift trucks built by MacDonald Truck and Manufacturing Co. are designed throughout for safety, smoothness, and speed—and MacDonald selected Bantam Quill Bearings for use on cross-head (shown in cross-section drawing) and on tilt arms of these trucks.

BATTERIES OF THESE POWER-SQUARING SHEARS are being used in war production plants for squaring and trimming metal sheets and for producing narrow strips. Among the many progressive engineering features included by Niagara Machine & Tool Works is the use of Bantam Quill Bearings on the main shaft. For further information on these compact, high-capacity anti-friction bearings, write for Bulletin H-104.

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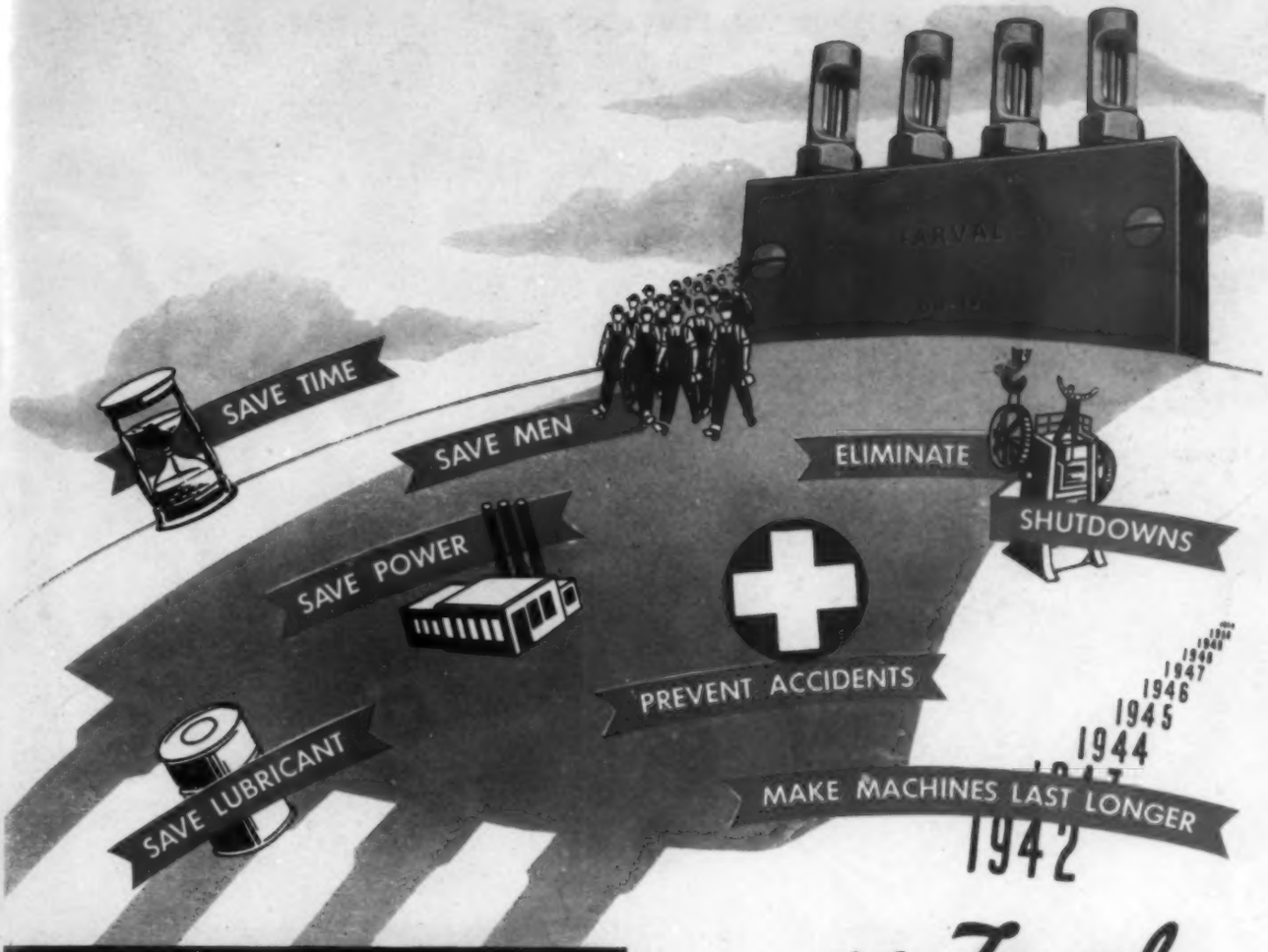

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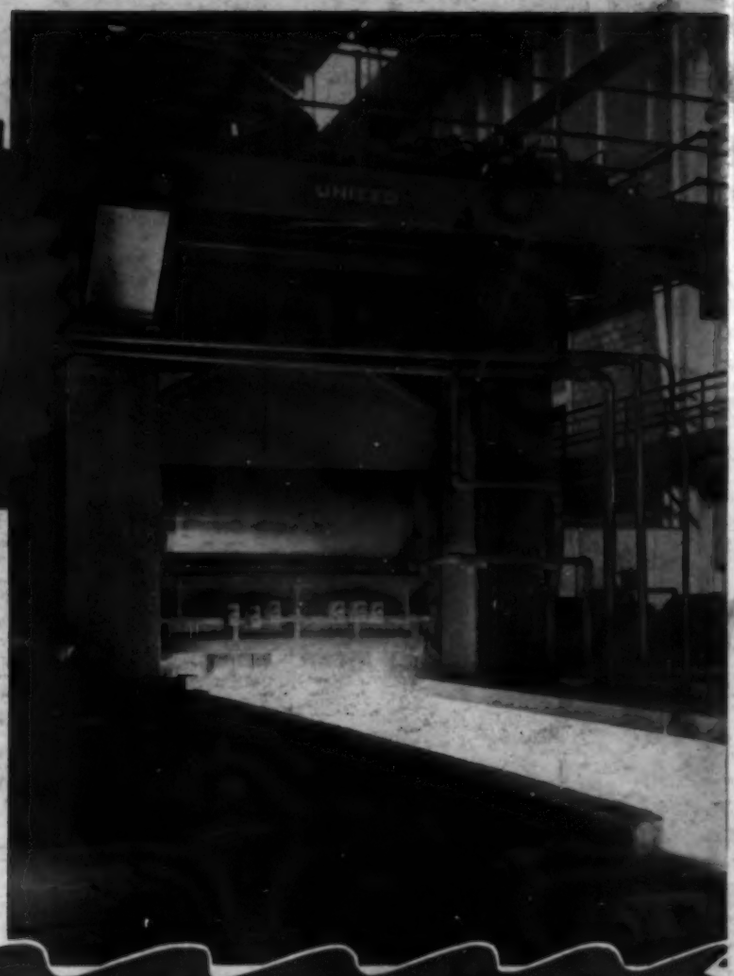

TO ASSURE VICTORY
BUY UNITED STATES WAR SAVINGS BONDS & STAMPS

Shown in the photograph is a 120" semi-continuous plate mill at work in one of the country's largest steel plants.

This mill was placed in operation in 1936 with all back-up rolls on Timken Bearings. To date more than 2,000,000 tons of plate have been rolled without any repairs to, or replacements of any back-up roll bearing.

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